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National
Forest

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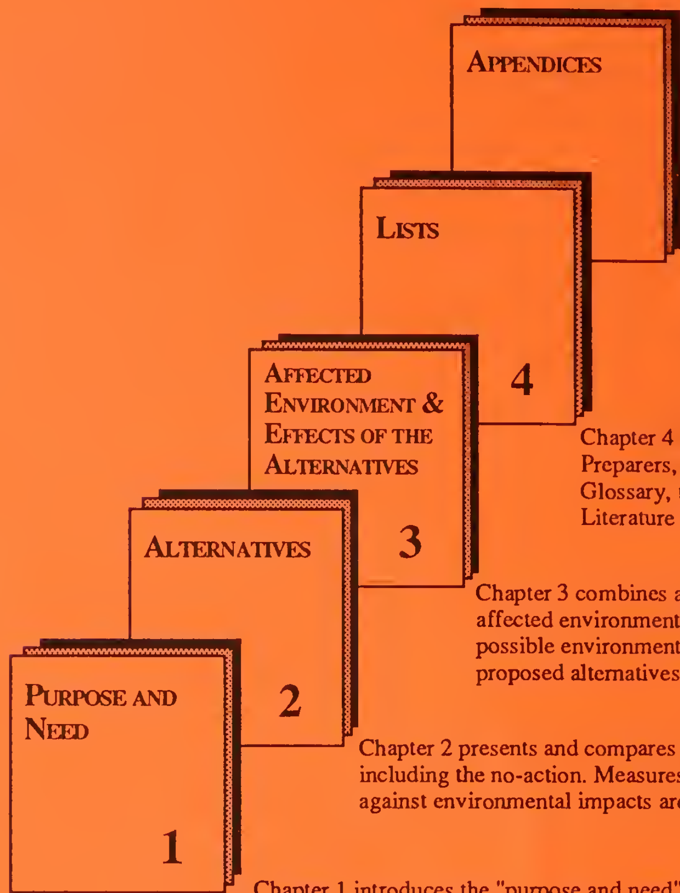
Central Prince of Wales Final Environmental Impact Statement

Ketchikan Pulp Company Long-Term Timber Sale Contract

Volume I

How This EIS is Organized



Appendices A—G provide additional documentation to the environmental analysis, and the Forest Service Response to Public Comment. Further information is included in the Planning Record.

Chapter 4 includes the List of Preparers, the Distribution List, the Glossary, the Index, and the Literature Cited list.

Chapter 3 combines a description of the affected environment with disclosure of the possible environmental consequences of the proposed alternatives.

Chapter 2 presents and compares the alternatives, including the no-action. Measures to monitor and protect against environmental impacts are also discussed here.

Chapter 1 introduces the "purpose and need" for the proposed action, the public issues surrounding the proposed action, and other considerations.

Acknowledgements

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Central Prince of Wales
Final Environmental Impact Statement

Ketchikan Pulp Company Long-Term Timber Sale Contract

Ketchikan Area—Tongass National Forest
USDA Forest Service
Alaska Region

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Abstract

The USDA Forest Service proposes to harvest approximately 290 million board feet (MMBF) of timber from an estimated 10,000 acres of the Central Prince of Wales (CPOW) Project Area, Thorne Bay Ranger District, Ketchikan Administrative Area, Tongass National Forest. Timber volume would be offered to the Ketchikan Pulp Company (KPC) under the KPC Long-Term Sale Contract (A10fs-1042), in separate offerings ranging in size from 10 to 50 MMBF. The CPOW EIS describes seven alternatives that provide different combinations of resource outputs and spatial locations of harvest units. The alternatives include: 1—no action, proposing no new harvest from the CPOW Project Area for the Long-Term Contract; 1A—no action/ no harvest, proposing no new harvest and cancellation of ongoing timber harvest in the Project Area; F2—configuring harvest units to reduce harvest of high value wildlife habitat and maintain the integrity of both Habitat Conservation Areas within the Project Area proposed by the Interagency Viable Population Committee; F3—configuring harvest units to focus on providing economical timber harvest for this timber entry; F4—configuring harvest units to provide economically viable timber harvest and maintain the integrity of the larger of the two Habitat Conservation Areas; F5 (preferred)—emphasizing ecosystem management principles while maintaining the integrity of the larger of the two HCA's; F6—configuring harvest units to respond to site-specific public concern by deferring harvest in specific units.

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Chapter 1

Purpose and Need

Key Terms

Long-Term Contract - Long-term Timber Sale Contract with Ketchikan Pulp Company; most recent EIS for this contract is referred to here as "1989-94 LTS EIS"
Land Use Designation (LUD) - method of classifying land uses, allocated by the Forest Plan
Management Area - an area for which management direction was written in the Forest Plan, encompassing one or more VCU's
Offering - a Forest Service specification of timber harvest units, subdivisions, roads, and other facilities and operations to meet the requirements of a contract
Old-growth Forest - a forest stand characterized by: trees usually well past the age of maturity, a variety of tree diameters and canopy levels, a diverse shrub and forb layer, dead and dying trees, snags, and downed woody material
Primary Sale Area (PSA) - an area specifically designated within Tongass National Forest pulptimber Allotments E, F, and G, to be made available to KPC for timber purchase under the Long-Term Contract; the CPOW Project Area falls within allotments E and G.
Record of Decision (ROD) - a document, based on information disclosed in the Final EIS, which identifies the alternative chosen, mitigation and monitoring measures to be implemented, and other information relative to the decision. The CPOW ROD will be issued by the Ketchikan Area Forest Supervisor.
Scoping Process - activities used to determine the scope and significance of a proposed action, what level of analysis is required, what data is needed, and what level of public participation is appropriate
Tongass Land Management Plan (TLMP) - the 10-year land allocation plan for the Tongass National Forest; TLMP was completed in 1979 and was amended in 1986 and 1991. TLMP is currently undergoing revision; a Supplement to the Revision Draft Environmental Impact Statement was issued in 1991. Until the Revision is completed, the TLMP as amended remains in effect.
Value Comparison Unit (VCU) - areas which generally encompass a drainage basin containing one or more large stream systems; boundaries usually follow easily recognizable watershed divides. VCU's provide a convenient ecological unit for conducting resource inventories and assessing impacts of management activities.

1 Purpose and Need

Introduction

This chapter specifies the underlying purpose and need to which the Forest Service is responding in proposing alternatives in this Environmental Impact Statement (EIS). The USDA Forest Service proposed action is to harvest approximately 290 million board feet (MMBF) of timber from an estimated 10,000 acres of the Central Prince of Wales (CPOW) Project Area, Thorne Bay Ranger District, Ketchikan Administrative Area, Tongass National Forest. Timber volume would be offered to KPC in separate offerings ranging in size from 10 to 50 MMBF. This action is proposed in order to help meet the three-year Current Timber Supply requirement of the Long-Term Timber Sale Contract (Long-Term Contract) between the Forest Service and the Ketchikan Pulp Company (KPC), and to contribute to the implementation of the Tongass Land Management Plan (TLMP 1979a, as amended). This action is proposed to be consistent with the standards and guidelines of Alternative P of the TLMP Revision Supplement to the Draft EIS (TLMP Draft Revision 1991a) currently in preparation.

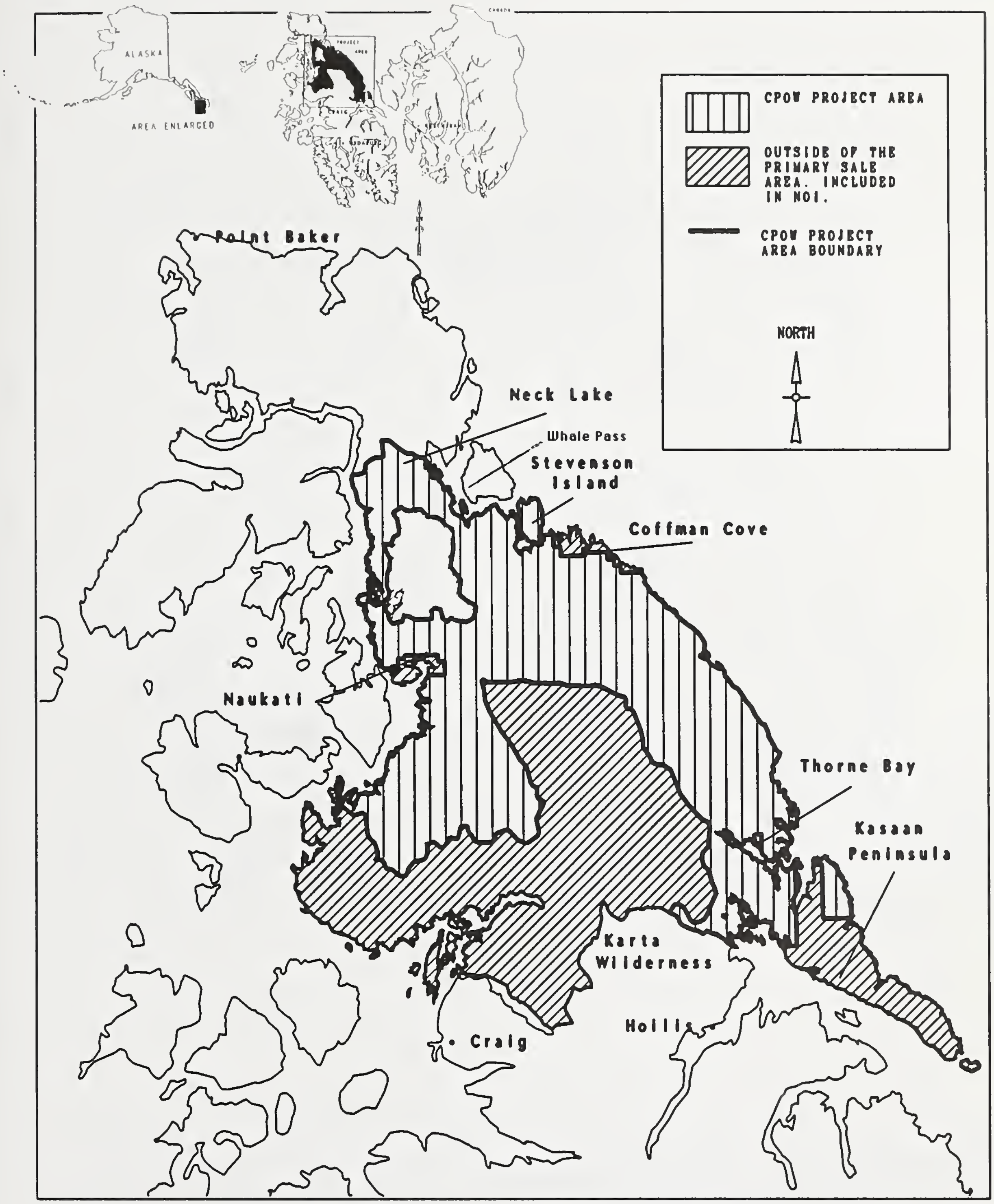
Project Area

The 321,866-acre Project Area is located on Prince of Wales Island approximately 50 air miles northwest of Ketchikan, Alaska. The boundaries as shown in the Notice of Intent (NOI) (August 30, 1991) encompassed approximately 600,000 acres. Under the NOI, the proposed timber harvest was restricted to the Primary Sale Area portion of the Project Area. The background to the Long-Term Contract and to limiting the project to the Primary Sale Area are discussed later in this chapter.

The Project Area encompasses all or portions of TLMP Management Areas K03, K07, K08, K09, and K10, which contain all or parts of 28 Value Comparison Units (VCU's), whose boundaries usually follow watershed divides.

Figure 1-1 displays the Project Area and its geographical relationship to the Ketchikan Area. Figure 1-2 displays the Management Areas located within the Project Area. Figure 1-3 displays the VCU's.

Figure 1-1
Central Prince of Wales Project Area Vicinity Map



The CPOW boundary as shown in the NOI included areas outside the Primary Sale Area. Since timber harvest for this project is restricted to the Primary Sale Area, the CPOW Project Area will be illustrated in this EIS as consisting only of the Primary Sale Area.

Figure 1-2
CPOW Management Areas

MANAGEMENT AREAS
A management area (MA) is an area for which specific management direction was written in the Forest Plan (TLMP 1979a, as amended 1986). Management areas encompass one or more VCU's.

Portions of Management Areas K03, K08, and K10 extend beyond CPOW project boundaries. Management Area K06 (Sarkar) is excluded from the Project Area. The management area portions within the CPOW Project Area are the same in both TLMP (1979a, as amended) and the TLMP Draft Revision (1991a).

Figure 1-3
CPOW Value Comparison Units (VCU's)

VCU's

Value comparison units (VCU's) are areas which generally encompass a drainage basin containing one or more large stream systems. Boundaries usually follow easily recognizable watershed divides.

Throughout this document (and in the separate map packet), VCU's may be referred to by either a 3-digit or 4-digit number, with or without a decimal point. For example, VCU 549.2 may also be written 5492; VCU 550 may also be written 550.0 or 5500.

Portions of VCU's 557, 574, and 577 extend beyond Project Area boundaries. VCU 554.1 (Sarkar) is excluded from the Project Area.

Purpose of and Need for Action

The purpose of and need for action is in part to help satisfy the three-year current timber supply requirement of the Long-Term Contract with Ketchikan Pulp Company (KPC). There also is a need to help satisfy the obligation set by Congress under the Tongass Timber Reform Act (TTRA) of 1990, directing the Forest Service "to provide a supply of timber from the Tongass National Forest which meets the annual market demand to the extent consistent with providing for the multiple use and sustained yield of all renewable forest resources." For this project the volume has been determined to be approximately 290 MMBF, a volume that reflects a management decision based on the most current schedule to provide a three-year timber supply of 615 MMBF for the KPC Long-Term Contract. (See Appendix A.) The purpose and need is further to move to implement the TLMP (1979a, as amended), thereby moving from the Existing Forest Condition to the Desired Future Condition, as specified in the TLMP Management Direction/Emphasis for the management areas within the Project Area.

The alternatives and actions considered in this analysis are possible approaches to meeting this purpose and need.

Contract Obligations

The Long-Term Contract with KPC was originally signed in 1951 and was most recently modified in February 1991 (see Background to the Long-Term Contract, later in this chapter). Under the terms of the modified contract, the Forest Service is required to "develop a tentative Offering schedule based upon the Tongass National Forest Land and Resource Management Plan, which shall display Offering Areas and timber volumes proposed for harvest.... The tentative schedule shall list sufficient timber volume and schedule commencement of the NEPA [National Environmental Policy Act] process by Offering Area or Areas to provide [KPC] a Current Timber Supply sufficient for at least three years of operations hereunder or until the contract termination date, whichever occurs first...." Further, the Forest Service is to "seek to specify sufficient Offerings to maintain a Current Timber Supply in all Offering Areas that totals at least three years of operations hereunder or until the contract termination date, whichever occurs first, and which meets the production requirements of [KPC's] manufacturing facilities." (KPC 1951, as amended)

The total timber harvest called for under the Long-Term Contract is 8.25 billion board feet. Analysis indicates that KPC needs to harvest an average of 205 MMBF per year to complete the contract. Four timber projects—North Revilla, CPOW, Lab Bay, and Polk Inlet—were initiated for the KPC Long-Term Contract within the Primary Sale Area (PSA), as directed by the contract to seek to find timber supplies within the PSA before seeking volume within contingency areas. These four projects are needed to produce sufficient volume to provide KPC with 205 MMBF for the 1993 logging season, as well as to provide a three-year timber supply of 615 MMBF. The desired timber supply is therefore 820 MMBF.

When these four projects were initiated there was expected to be approximately 120 MMBF of timber volume (approximately 30 MMBF within the CPOW Project Area) remaining from a previous NEPA project (1989-94 LTS EIS) which would be available to KPC by the time the CPOW Final EIS is released. Therefore, these four projects were determined to need to produce a total of 700 MMBF, which when combined with

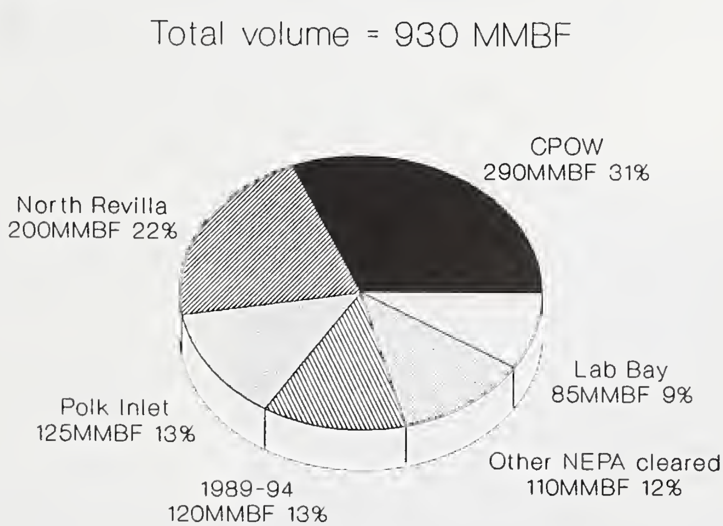
the 120 MMBF currently available, would provide volume for the 1993 logging season, plus would contribute to maintaining a three-year timber supply.

This 700 MMBF was divided among the four timber projects based on the size of the project areas, as well as on their relative abilities to produce timber volume in an expedient fashion. Other factors considered in making this volume determination for the CPOW project included: (1) this harvest level is consistent with the sale schedule in the TLMP (1979a, as amended); (2) sufficient volume has been determined to be available in the CPOW Project Area; (3) there is an extensive road network in place; (4) the number and location of Log Transfer Facilities (LTF's) is sufficient to handle this volume of timber within a three-year time frame; (5) there are existing KPC-operated logging camps within the CPOW area to handle this volume; and (6) the current Forest Plan (TLMP 1979a, as amended) calls for harvest in this Project Area.

Once these four projects were underway, delays were experienced in their completion. These delays were such that only limited volume could be made available from them for the 1993 logging season. This also had an effect of delaying the time when a three-year timber supply could be achieved. In an effort to provide enough volume for the 1993 logging season, and to stay on schedule for attaining a three-year timber supply, four independent sales were released to KPC. These sales total 107 MMBF and include: 12-Mile (12 MMBF), Frosty (33 MMBF), Shelter Cove (17 MMBF), and Starfish (45 MMBF). Frosty and Starfish are located on the Wrangell District of the Stikine Area.

Figure 1-4 illustrates the current and projected timber supply for the long-term contract with KPC.

Figure 1-4
Contribution of Projects to Contract Requirements



See Why the CPOW Project Area was selected, later in this chapter, for further discussion of the KPC contract.

Existing and Desired Future Condition

The existing condition of the CPOW Project Area is described in Chapter 3 of this EIS, in the "Affected Environment" portion of each resource section. The Project Area is approximately 95 percent forested, with about 24 percent in noncommercial (scrub) timber, 28 percent in second growth, and 43 percent in old-growth commercial forest. The area is heavily roaded. The Project Area provides habitat for numerous wildlife species including deer, black bear, martens, and bald eagles. Salmon and native trout spawn in the numerous streams. Recently, significant caves have been discovered and explored. The Project Area provides recreation, subsistence, and employment opportunities for many individuals and communities.

The Desired Future Condition for the Project Area was established through the Forest planning process and is presented in the TLMP, as amended in 1986 (USDA Forest Service 1986). This Desired Future Condition was specified in the Management Direction/Emphasis for each management area, and contained goals for timber, recreation, visuals, fish, wildlife, and other resources. In general, the Plan Outlook in the 1986 amended TLMP anticipated that timber-related employment would basically remain the same if more marginal timber could be harvested; other direction provided for fishery, wildlife, and recreation values in the areas not recommended for wilderness. More than half of the Forest was anticipated to remain in a basically unmodified state over time if current land use designations remained the same. For specific Management Emphasis and Direction for each management area in the CPOW Project Area, see TLMP as amended in 1985-86 (USDA Forest Service 1986, Doc.147).

The Management Emphasis and Direction was reformulated as the Desired Future Condition in the TLMP Draft Revision (1991a). This Desired Future Condition consists of a mosaic of timber stands of varying sizes and ages, interspersed with areas of old growth and nonforest vegetation, furnishing a sustained yield of timber in balance with other resources and uses.

Achievement of the TLMP Draft Revision Desired Future Condition will require many decades. It will be reached by applying ecological resource management practices that are responsive to site-specific, on-the-ground conditions. Roaded access would be provided for suitable timber lands. Harvested old-growth timber will be converted to successive stands of younger trees. Timber including saw logs and utility volume will have contributed to the forest allowable sale quantity (ASQ) (the maximum amount of timber that may be sold each decade).

Riparian areas will be managed to benefit riparian dependent resources. Water quality will continue to meet or exceed state standards. Fish habitat conditions will have been maintained or improved. Sensitive visual resources, particularly as viewed from salt water, will have been conserved.

Recreation opportunities will continue to be associated with roads, motorized boat access from salt water, and float planes. These recreation opportunities will be maintained or improved.

Old-growth stands will be reduced and fragmentation will increase. However, remaining old-growth is consistent with the predicted cumulative effects shown in the TLMP Draft Revision (1991a). Remaining old growth will contribute to wildlife habitat capability for ensuring maintenance of well distributed viable populations. Management will be adjusted to accommodate any verified use of the area by threatened, endangered, or sensitive species.

Proposed Action

The Tongass National Forest, Ketchikan Area, proposes to harvest approximately 290 MMBF of timber from an estimated 10,000 acres on Central Prince of Wales Island. This would be accomplished through a series of offerings beginning in 1993 or 1994. Approximately 100 miles of new road would be built to facilitate timber removal. Five existing Log Transfer Facilities (LTF's) would be used to implement the proposed action; no new LTF's are proposed.

All the alternatives respond to the purpose of and need for action described earlier in this chapter. Detailed maps of proposed alternatives are included in the supplementary map packet. The action alternatives are designed to meet the requirements of the Long-Term Sale Contract and protect affected natural resources, while meeting the objectives and requirements of all relevant laws and higher level Forest Service plans.

Decision To Be Made

This EIS is not a decision document, but is written to provide sufficient information to form a basis for decision-making. The Forest Supervisor of the Ketchikan Area, Tongass National Forest, will decide whether and when to harvest timber, and how much timber to make available for harvest. The Forest Supervisor can decide to: 1) select one of the alternatives analyzed within the Final EIS, including either of the no-action alternatives; 2) modify an alternative, as long as the environmental consequences of the modified action have been analyzed within the Final EIS; or 3) reject all alternatives. If an alternative is selected, it will be documented in the Record of Decision (ROD).

The CPOW Record of Decision will document the Forest Supervisor's decision on whether to harvest timber from the Project Area and on the location and amount of any timber to be made available for harvest.

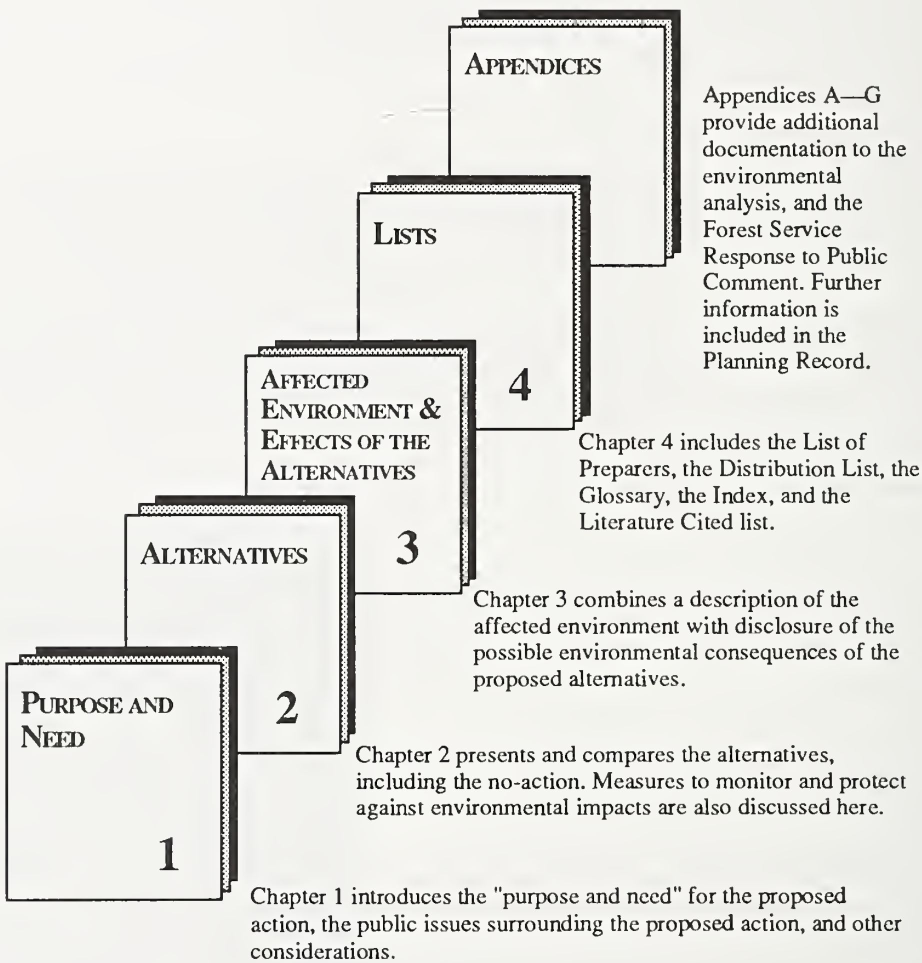
Organization of This Document

This EIS follows the format established by the Council on Environmental Quality (CEQ) regulations (40 CFR 1500-1508). The environmental, economic, subsistence, and social consequences of seven alternative actions—including a no-action alternative and a no-action/no-harvest alternative—will be disclosed.

The document is divided into four main chapters, as outlined in Figure 1-5. Supporting materials are included in Appendices A-G. Additional supporting materials may be found in the project Planning Record located at the Forest Supervisor's office in Ketchikan.

Figure 1-5

How This Document is Organized



Relationship to Other Planning Levels

The Central Prince of Wales EIS is part of a planning process that involves several levels of decision-making. The sequence begins with long-range planning at the national level and continues through the regional and forest levels to the project level. Because this EIS is a project level analysis, its scope is confined to issues within the Project Area; that is, it does not attempt to further analyze decisions made in the higher level plans described below. It does, however, implement direction provided at those higher levels.

National Level

The 1990 Program, developed in accordance with the Forest and Rangeland Renewable Resources Planning Act of 1974 (RPA), as amended, provides national direction for the management of national forests and grasslands.

Regional Level

The Alaska Regional Guide (1983) addresses regional issues specific to Alaska, and establishes management standards and guidelines for the Tongass and Chugach national forests.

Forest Level

The National Forest Management Act of 1976 (NFMA) directs each national forest to prepare a land management plan. The Tongass Land Management Plan (TLMP) was completed in 1979 to guide management of the Tongass National Forest. It was amended in 1986 and again in 1991. TLMP is currently undergoing revision, as mandated by the NFMA; a Supplement to the Revision Draft Environmental Impact Statement was issued in 1991 (USDA Forest Service 1991a). Until the Revision is completed, the TLMP as amended remains in effect.

Figure 1-6 illustrates the TLMP process and its relationship to the CPOW project.

Project Level

Other Projects

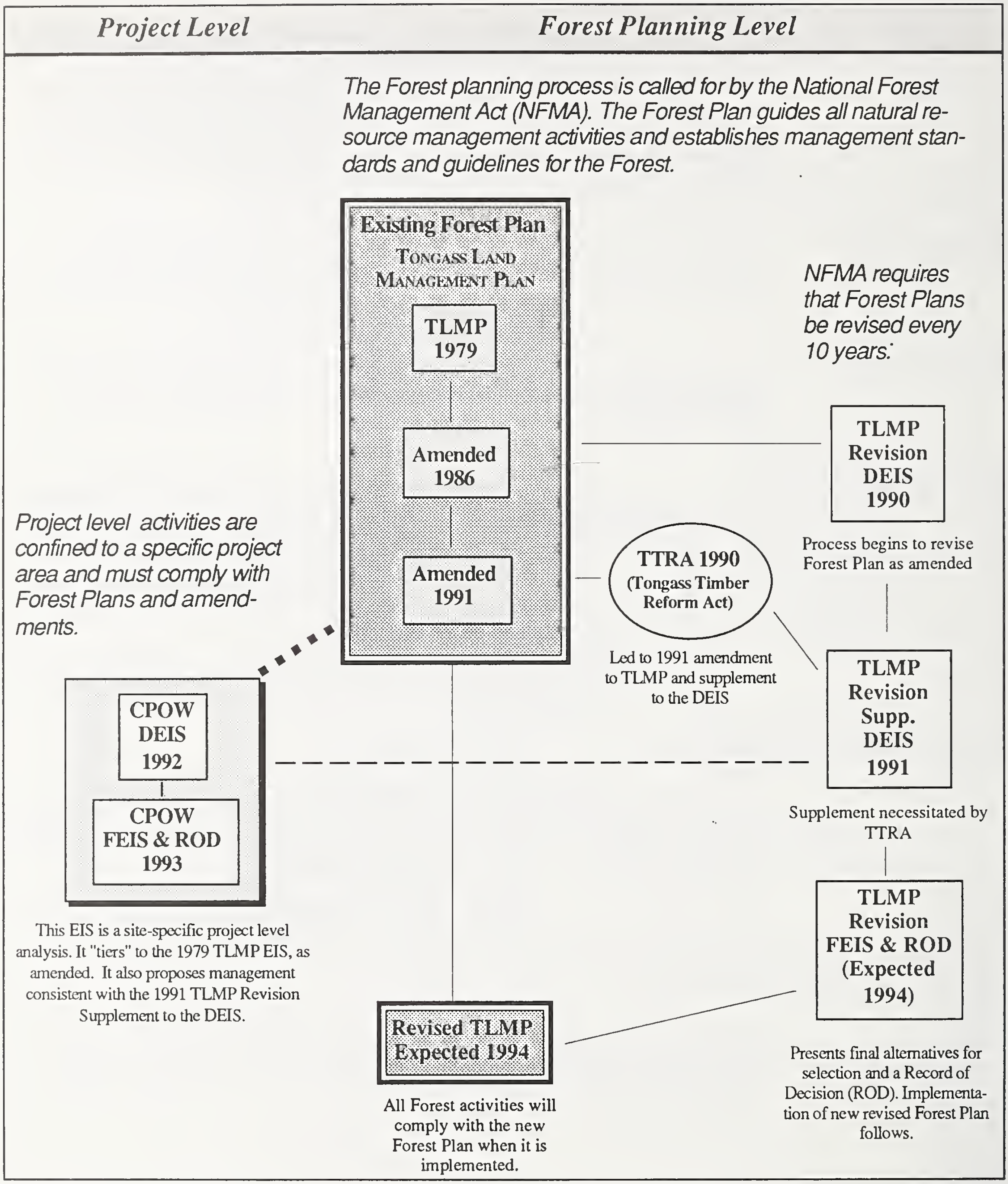
The 1989-94 Long-Term Sale Contract EIS (LTS EIS) was the most recent EIS addressing the KPC Long-Term Contract on the Project Area. It analyzed the effects of harvesting 960 MMBF on the Ketchikan Area, including the CPOW Project Area. Harvesting under this project is nearing completion.

CPOW analyses consider and are coordinated with similar proposed timber harvests north of the Project Area (Lab Bay) and south of the Project Area (Polk Inlet).

Current Project

The CPOW EIS presents a range of alternatives, and displays site-specific descriptions and impacts of the proposed activities in Alternatives 1–F6. The Interdisciplinary Team (IDT) used a systematic approach to analyze the proposed project, estimate the environmental effects, and prepare this EIS.

Figure 1-6
Relationship of CPOW EIS to TLMP Planning Documents



The CPOW EIS **tiers** to the environmental analyses for the following documents:

- TLMP 1979a, as amended in 1986 and 1991.
- The Alaska Regional Guide, 1983.

"TIERING"
Elimination of repetitive discussions of the same issue by incorporating by reference the general discussion in an EIS of broader scope. For example, a project level EIS can tier to the Forest Plan EIS.

This EIS makes no new land allocations. Such decisions are made by the Forest Plan.

This EIS proposes management consistent with the TLMP Revision Supplement Draft EIS, Alternative P (USDA Forest Service 1991a).

The planning process complies with the National Environmental Policy Act (NEPA). Planning was coordinated with affected Federal and State agencies.

Land Use Designations

The current TLMP (1979a, as amended) designates areas appropriate for various management activities through four Land Use Designation (LUD) allocations. The proposed TLMP Draft Revision (1991a) would provide more specific management direction by subdividing the Project Area into refined LUD's and by applying specific standards and guidelines. This EIS proposes management in accordance with the existing TLMP LUD's and also utilizes the standards and guidelines presented in Alternative P of the Draft Revision.

TLMP, as Amended

The CPOW Project Area is allocated to LUD III and IV areas, which are summarized below. Full definitions of LUD's and their specific authorized activities are presented in the current TLMP (1979a, as amended). See the Glossary of this EIS (Chapter 4) for descriptions of LUD's I and II.

LUD III

Lud III areas are to be managed for a variety of uses. These areas usually have high amenity values along with high commodity values. The emphasis is on managing for both amenity and commodity oriented uses in a compatible manner to provide the greatest combination of benefits. Allowances in calculated potential timber yield have been made to meet multiple-use coordination objectives.

LUD IV

These areas are managed to provide opportunities for intensive development of resources. Emphasis is primarily on commodity or market resources and their uses. Amenity values are also considered. When conflicts regarding competing resource uses arise, resolution most often would be in favor of commodity values. Allowances in calculated potential timber yield have been made to provide for protection of physical and biological productivity.

TLMP Revision

TLMP is currently undergoing revision as required by the NFMA. The TLMP Draft Revision (1991a) describes more specific LUD's, eight of which apply to the CPOW Project Area. Management direction for the Revision LUD's and details of the

Management Prescriptions are presented in the TLMP Draft Revision (1991a). For the purposes of the CPOW EIS, references to the TLMP Draft Revision will mean Alternative P of the Revision Supplement to the Draft EIS unless otherwise noted. The TLMP Draft Revision LUD's and other land ownerships allocated in the CPOW Project Area are summarized below and presented in Table 1-1.

Tongass Land Management Plan (TLMP)

TLMP, as amended
The existing Forest Plan, or TLMP, of 1979 was amended in 1986 and 1991. TLMP, as amended, is the Forest Plan in effect until a revised Plan is in place. This EIS references TLMP and its amendments as: TLMP (1979a, as amended).

TLMP Revision
As required by NFMA, TLMP is undergoing revision. The TLMP Revision Draft EIS was completed in 1990. A Supplement to the Revision was necessitated by TTRA and was completed in 1991. This EIS references all the TLMP revisions, as: TLMP Draft Revision (1991a).

Alaska State Lands (AK)

Lands belonging to the State of Alaska.

Modified Landscape (ML)

The objective of this LUD is to provide a mix of management options, while minimizing the visibility of development activities in the foreground, and allowing more development in the middle and background distances. The Desired Future Condition is that of a multi-aged forest landscape where activities are designed to borrow from, and relate to, features found in the characteristic landscape.

Other Areas (OA)

The emphasis of this LUD is the stewardship and protection of lands for which there is no other specific land use emphasis. These lands may be rock, ice, muskeg, brush, grass, and forested lands classified as unsuitable for timber production. Most often, they will be managed in their existing natural condition.

Private (PV)

Privately owned lands.

Recreation River (RR)

The emphasis of this LUD is to maintain, improve, and protect the essentially free-flowing character and outstandingly remarkable values which qualify the river to be considered eligible for inclusion in the National Wild and Scenic River system as a Recreational River. The area may include landscapes in a variety of visual conditions.

Scenic River (SR)

The emphasis of this LUD is to maintain, enhance and protect the free-flowing character and the outstandingly remarkable values of river segments which qualify the river to be considered eligible for inclusion in the National Wild and Scenic River system as a Scenic River. These areas may provide recreation opportunities which meet high expectations for scenic quality associated with an essentially natural-appearing environment and a free-flowing river.

Scenic Viewshed (SV)

The emphasis of this LUD is to provide scenic landscapes, vistas, and travel corridors in areas viewed from roads used primarily for recreational driving, trails, major marine travel routes, recreation sites, and popular bays and anchorages where forest visitors have high expectations for scenic quality. Recreation facilities may be present. This LUD may include landscapes that have been modified in the past, but future management will focus on restoring and maintaining scenic quality.

Timber Production (TP)

The emphasis of this land use designation is for timber production. The primary objective is to manage the area, using silvicultural techniques, to maintain and promote industrial wood production. These lands will be managed to advance conditions favorable for the development of the timber resource and for maximum long-term timber production.

Beach Fringe and Estuary (BF)

The emphasis of this land use designation is to manage natural beach fringe and estuary habitats to favor wildlife, fish, recreation, visual and other resources associated with beach fringe and estuary areas. Habitats for shorebirds, waterfowl, bald eagles, and other marine-associated species are emphasized. *Areas allocated to this land use designation are incorporated into several other categories and are not presented separately in Table 1-1.*

Stream and Lake Protection (SL)

The emphasis of this land use designation is to maintain riparian habitat for fish and other riparian-associated resources. This prescription applies to areas comprised of aquatic and riparian ecosystems, including riparian streamsides, lakes, and floodplains, as well as the zones of interaction between the riparian and upland terrestrial ecosystems. Conflicts in management activities are settled in favor of riparian-associated fish and wildlife. *Areas allocated to this land use designation are incorporated into several other categories and are not presented separately in Table 1-1.*

CPOW Project Area LUD's

The CPOW Project Area encompasses all or part of five management areas, as shown on Fig. 1-2. Table 1-1 presents CPOW Project Area Management Areas, VCU's, LUD's (both TLMP and TLMP Draft Revision), and corresponding acres.

Table 1-1
Management Areas (MA), Value Comparison Units (VCU), and LUD's

		TLMP LUD*		Draft Revision LUD (Alt.P)** Approximate Acres***								Total MA Acres in CPOW
MA	VCU	LUD	Acres	AK	ML	OA	PV	RR	SR	SV	TP	
K03	549.2	IV	6,909		4,768					345	1,796	
	550	IV	10,630		4,571					106	5,953	
	551	III	5,232		4,029					1,046	157	
												22,771
K07	554.2	IV	8,873		1,952			532		1,242	5,147	
	557	IV	3,141							346	2,795	
	571	IV	16,613								16,613	
	587.1	IV	7,842							1,568	6,274	
	588	IV	26,634		799					4,528	21,307	
	589	IV	20,028		1,602						18,426	
	590	IV	13,786								13,786	
												96,917
K08	552	III	8,165		3,103				1,796	3,266		
	553	IV	7,520		150						7,370	
	573	III	26,008		8,959				6,936	9,824	289	
	574	III	13,659		1,502				3,415	8,469	273	
	577	IV	13,625						136	818	12,671	
												68,977
K09	572	IV	7,604	1,673	76					2,129	3,726	
	579	IV	10,710		3,320					107	7,283	
	580	IV	15,393			3,848				154	11,391	
	581	IV	20,008		7,803					1,200	11,005	
	582	III	4,014		120					3,774	120	
	583	IV	12,242		5,754	122				612	5,754	
	584	III	13,476		5,795					7,546	135	
	585	IV	10,439		3,132					104	7,203	
												93,886
K10	586	III	15,282	5,043	6,265			1,223		2,598	153	
	598	IV	12,929	388	129						12,412	
	599	IV	6,363	2,736	1,845					1,782		
	600	IV	3,213		129					3,084		
	601	IV	1,343	658			81				604	
												39,130

*September 1990. Private and state lands are incorporated within the LUD categories. SOURCE: Ketchikan Area GIS data base.
**April 29, 1991. AK=State land ML=Modified Landscape OA=Other Area PV=Private land RR=Recreation River SR=Scenic River SV=Scenic Viewshed TP=Timber Production WR=Wild River. Additional acres of Stream and Lake Protection LUD and Beach Fringe LUD are incorporated within these categories. See TLMP Draft Revision (1991a) for map of each area.
***Includes only that portion of the VCU within the Project Area.

Why the CPOW Project Area was Selected

This section explains the modifications to the Long-Term Contract and other management considerations that influenced the schedule of environmental analyses for the Ketchikan Area. CPOW is one of several existing projects. See Appendix A for the full rationale supporting the following discussion.

Background to the Long-Term Contract

In 1951, the Forest Service and KPC signed an agreement entering into a Long-Term Timber Sale Contract (Long-Term Contract) to harvest approximately 8.25 BBF, valid for the period 1954 to 2004. In response to the post-war boom, Japanese interest in Alaska timber, and the desire to establish a stable industry in Southeast Alaska, Congress authorized the Forest Service to develop this Long-Term Contract and others, for a total supply of nearly 23 BBF of timber over the life of the contracts.

Portions of the Ketchikan Area (within pulptimber allotments E, F, and G) were allocated as the Primary Sale Area (PSA). The PSA was specifically for use by KPC under the Long-Term Contract, although additional cutting areas outside the PSA could also be designated for KPC, and the Regional Forester could offer portions of the PSA to purchasers other than KPC, under certain conditions. The Long-Term Contract was divided into five-year appraisal periods in the mid-1960's, and required redetermination of payment rates every five years. In conjunction with rate redetermination, an operating plan was developed which described the timber harvest and associated activities that would take place during the upcoming five-year period.

The Long-Term Contract between the USDA Forest Service and KPC expires June 30, 2004. As of October 1, 1991, the Forest Service is obligated to provide KPC with an additional 2.6 BBF to meet contractual commitments. This equates to approximately 205 MMBF per year until the expiration date.

KPC Contract Modifications Resulting from TTRA

On November 28, 1990, President Bush signed into law the Tongass Timber Reform Act (TTRA). Among other provisions, Section 301 of this Act imposed unilateral changes to the Long-Term Contract with KPC to make it more consistent with independent National Forest timber sale programs. Consistent with unilateral changes resulting from TTRA that became effective in February 1991, timber now is made available for harvest from smaller timber offering areas. This is in contrast to preparing a single EIS for the entire contract area, as was the case for the five-year appraisal periods. Management requirements and the NEPA planning process are to be consistent with those for the independent timber sale program (TTRA 301(c)(1)). Offerings specified after February 1991 must comply with the requirements of TTRA, including proportionality, streamside buffers, and other provisions.

The TTRA requires the Forest Service to follow a planning and environmental analysis process consistent with independent National Forest timber sales. Timber will be provided within the contract boundary in designated "timber offering areas." Offering areas may vary in size, largely depending on logical transportation systems and the amount of timber necessary to meet contract requirements. Offering areas are to be managed like independent timber sale areas.

These timber offerings will be based on volume needed to meet contractual obligations stated in B0.52, B0.61, and B0.62 of the amended KPC contract (1951, amended February 1991). In part, B0.62 says the "Forest Service shall seek to specify sufficient Offerings to maintain a Current Timber Supply in all Offering Areas that totals at least three years of operations." This translates to approximately 615 MMBF for three years of normal timber stock; this amount is designed to allow KPC to schedule the flow of raw materials to their processing facilities.

Additional Cutting Areas

Under KPC contract provision B0.31-Additional Areas, "the Regional Forester shall designate additional cutting areas within Pulptimber Allotments E, F, and G to meet such needs of such plants for the period ending June 30, 2004." The preferred alternative in the TLMP Draft Revision (1991a) indicated that both the Primary Sale Area and the additional contingency areas would be needed to meet the timber volume contractual obligations. A tentative operating schedule was developed and approved for implementation based on this analysis (see Appendix A). Areas within the KPC Primary Sale Area boundary are scheduled first, while the area outside the Primary Sale Area boundary is scheduled later as required under contract provision B0.31. Virtually every VCU that is in a LUD III or IV area (permitting timber harvesting) is scheduled to be harvested to some extent within the next 12 years to meet the needs of the KPC Long-Term Contract and independent timber purchasers.

Contract Administration

On June 19, 1992, the USDA Forest Service Region 10 Regional Forester supplemented the original delegation of authority letter for the KPC Contract for administration of this contract as follows:

"FSM 2402.21 Item 5 states 'A line officer may approve multi-sale decision documents prepared in compliance with NEPA and Council on Environmental Quality regulations at 40 CFR Parts 1500-1508, provided that the line officer has authority to approve each of the timber sales included in the multi-sale decision (40 CFR 1508.25).' The Forest Supervisor is authorized to approve operation plans and NEPA decision documents for individual Offerings within the guidelines outlined in FSM 2402.21 Item 5. This authority may not be redelegated, except to a successor or to an Acting Forest Supervisor."

As a result of this delegation of authority, the Forest Supervisor of the Ketchikan Area is now the responsible official for this Environmental Impact Statement.

Summary: Why CPOW

In summary, the CPOW Project Area was selected for environmental analysis at this time for the following reasons:

- The CPOW Project Area is within the designated Primary Sale Area for the KPC Long-Term Contract, and contains a sufficient amount of harvestable timber volume designated as LUD III or IV, and therefore is appropriate for harvest under the TLMP (1979a, as amended). Available information indicates that harvest of the amount of timber being considered for this project can occur consistent with Forest Plan (TLMP 1979a, as amended, and TLMP Draft Revision 1991a) standards, guidelines, and other requirements for resource protection.

- Additional areas with available timber inside the CPOW Project Area will be necessary for harvest within the remainder of the KPC contract term (by 2004) in order to meet contract volume requirements. Effects on subsistence resources are projected to differ little according to which sequence these areas are subjected to harvest. Harvesting other areas on the Tongass National Forest with available timber is expected to have similar potential effects on resources, including those used for subsistence, because of widespread distribution of subsistence use and other factors. Harvest of these other areas is foreseeable, in any case, over the forest planning horizon under either the existing or the draft revised Forest Plan.

  There are four EIS's currently underway which comprise virtually all of the Primary Sale Area in the Ketchikan Area. Five additional projects are in the initial stages of development. These are: Control Lake, Heceta, Upper Carroll, Three Creeks, and Sea Level. Another project within the Primary Sale Area was completed in 1991, but is scheduled for harvest by independent timber purchasers. These are listed below and presented in Figure 1-7.

Central Prince of Wales EIS	North Revilla EIS
Lab Bay EIS	Polk Inlet EIS
Control Lake EIS	Upper Carroll EIS
Heceta Island EIS	Three Creeks EIS
North Sea Otter Sound ROD	Sea Level EIS

- Providing substantially less timber volume than required by the KPC contract in order to avoid harvest in the CPOW Project Area or other project areas would not meet contract requirements and is otherwise not necessary or reasonable.

- It is reasonable to schedule harvest in the CPOW Project Area at present rather than in other areas in terms of previous harvest entry and access, level of controversy over subsistence and other effects, and the ability to complete the NEPA process and make timber available to meet contract requirements by the time it is reasonably necessary to do so. Other areas that are reasonable to consider for harvest in the near future are the subject of other project EIS's that are currently ongoing or scheduled to begin soon.

For further details on why the CPOW area was selected, see Appendix A.

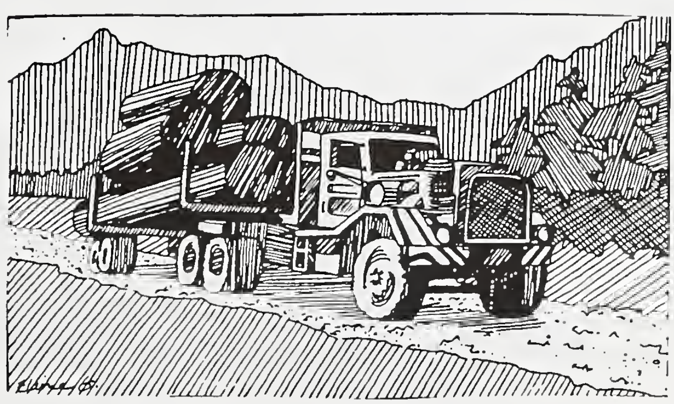
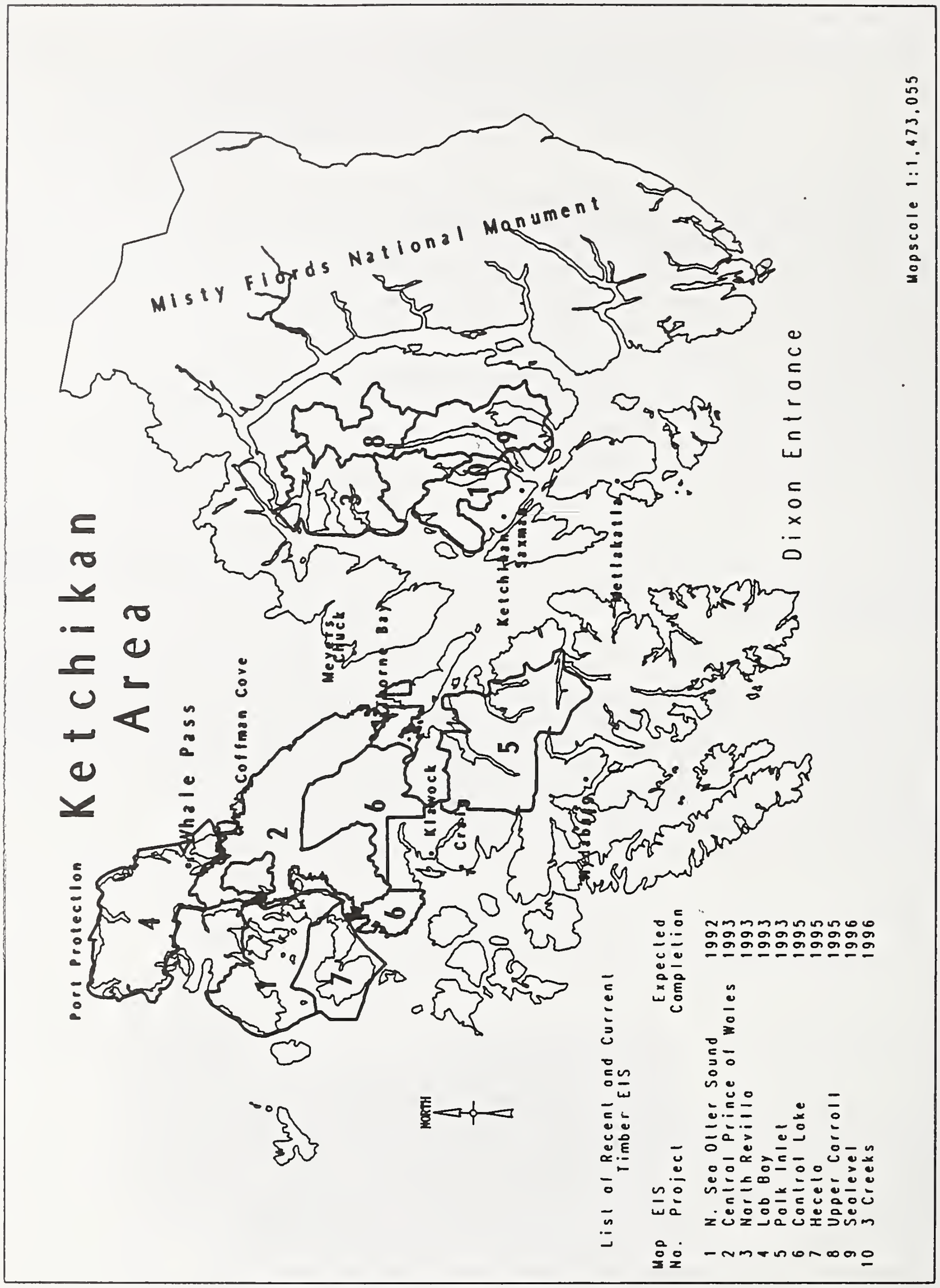


Figure 1-7
Recent and Current Long-Term Sale EIS Projects



Public Involvement

Scoping

The NEPA scoping process (40 CFR 1501.7) was used to invite public participation and to determine the scope of this project, including the issues to be addressed. The Forest Service sought information, comments, and assistance from Federal, State, and local agencies, and from other groups and individuals interested in or affected by the proposed action. The following steps were included in the public scoping process:

- **Public Mailing**. On August 15, 1991, a letter seeking public comment was mailed to approximately 2,100 groups and individuals who had previously shown interest in Forest Service projects in Southeast Alaska. The mailing included 8 Federal agencies, 18 State agencies and divisions, 67 Native and municipal offices, and 213 businesses, local Fish and Game advisory committees and other organizations and groups, in addition to individual citizens. Of the 100 responses to this mailing and to the publication of the NOI and scoping documents (below), 32 had substantive comments, while 68 had no comments but wished only to remain on the mailing list.

- **Notice of Intent (NOI)**. A Notice of Intent was published in the Federal Register on August 30, 1991.

- **Local News Media for Scoping**. A scoping document with project map was placed in the September 7, 1991, weekend edition of the *Ketchikan Daily News*, and in the *Island News*. A press conference was held October 17, 1991, to discuss current planning projects on the Ketchikan Area of the Tongass National Forest, including the Central Prince of Wales EIS.

- **Second Public Mailing**. On March 23, 1992, a second mailing was sent to 376 names, including those who responded to the first mailing or who later asked to be placed on the mailing list, plus additional individuals, organizations, and agencies. This letter summarized the significant issues derived from the initial public comments, outlined the tentative alternatives to be analyzed in the Draft EIS, and invited public attendance at scoping feedback meetings described below.

- **Scoping Feedback Meetings**. Meetings were held in April 1992 to disclose the tentative alternatives and to answer questions from the public. The following meetings were held: April 6, with representatives of the Alaska Department of Fish and Game (ADF&G); April 7, with representatives of Ketchikan Pulp Company (KPC); April 8, with the public at Thorne Bay, Prince of Wales Island; April 9, with the public at Ketchikan; April 10, at Craig, Prince of Wales Island, with representatives of the following conservation organizations: Southeast Alaska Conservation Council (SEACC), Greenpeace, Prince of Wales Conservation League, Alaskans for Responsible Resource Management.

  Legal notices announcing the Ketchikan public meeting and the Thorne Bay public meeting were placed in the *Ketchikan Daily News* and the *Island News*; public service announcements and news releases were sent to radio stations and newspapers in Ketchikan, Thorne Bay, Wrangell, and Petersburg. A radio interview with CPOW IDT Leader Bill Shoaf discussing the project and the upcoming public meetings was broadcast on KRBD-FM, Ketchikan, April 2 and 3.

Draft EIS

- **Third Public Mailing.** A letter was sent to approximately 2,100 names on June 5, 1992, providing an opportunity for people to indicate how they would like to continue participation in the CPOW planning process. The mailing list consisted of the original list amended by responses to the first mailing and subsequent public meetings. Responses to this third mailing became the basis for the Distribution List used to mail copies or summaries of the Draft EIS as requested.

- **Briefings.** Additional briefings were held in July and August 1992 with representatives of Ketchikan Pulp Company, Alaska Department of Fish and Game, Tongass Conservation Society, Southeast Alaska Conservation Coalition, and Greenpeace.

- **Availability of Draft EIS for Public Comment.** Availability of the Draft EIS was announced in the *Federal Register* on October 23, 1992, with deadline for public comment listed as December 7, 1992. Documents were mailed, fourth class, to the Distribution List on October 13, 1992. An extension of the comment deadline to December 14, 1992 was published in the *Federal Register*.

  A press briefing was held in Ketchikan on October 14, 1992. Legal notices of the availability of the Draft and announcing the schedule for public hearings and subsistence hearings were placed in the *Ketchikan Daily News* (October 23-26) and the *Island News*. Additional notices to radio stations and newspapers in the region were issued on October 14.

- **Subsistence Hearings** were held in the following locations: Coffman Cove (Dec. 3), Craig (Nov. 18), Hydaburg (Nov. 19), Ketchikan (Nov. 23), Klawock (Nov. 17), Saxman (Nov. 24), Thorne Bay (Dec. 1), and Whale Pass (Dec. 2). Announcement of time and location of the hearings was included in the letter accompanying every document and was announced by public media as described above. Comments were recorded. Open houses to describe the analysis process and answer public questions were held in conjunction with the subsistence hearings.

Final EIS

- Approximately 375 individuals, agencies, and organizations submitted written comment on the CPOW DEIS. In addition, 34 verbal testimonies were received at the 8 subsistence hearings. Written comments and subsistence comments were analyzed and incorporated into the Final EIS as appropriate. The 45-day comment period officially closed December 14, 1992, but letters were accepted and comments analyzed and incorporated until February 1, 1993.

- The Final EIS has been filed with the Environmental Protection Agency and is available to the public.

  For a complete analysis of public comment and the Forest Service response to public comment, see Appendix D.

Copies of the legal notices and newspaper articles, as well as comments received, are included in the project Planning Record.

Issues Associated with the Proposed Action

The significant issues, concerns, and management opportunities identified through the public and internal scoping process, as well as from public comment received on the CPOW Draft EIS, are listed below as issue statements. Some of these issues were raised by the public, and some reflect Forest Service concerns about specific resources and legal requirements to meet key TLMP standards. Similar concerns were grouped when appropriate. Issues 1-8 were determined to be significant issues within the scope of the project. Every alternative addresses all of these issues to varying degrees.

Significant Issues Within the Scope of the Project

1. **Cost effectiveness of timber harvest operations**

   This issue focuses on the economics of timber harvest while protecting resource values.

   Examples of public concerns included:
   - whether logging and road construction costs would preclude an economical timber harvest for KPC.
   - whether cost-effective harvesting methods would be planned for, specifically minimizing or eliminating expensive systems such as helicopter yarding.
   - whether economical timber harvest would cause excessive harvest of volume class 6 and 7 timber types, and thereby exceed requirements for timber proportionality as mandated by TTRA.
   - whether design of timber harvest units would include consideration of alternate harvest methods to clearcutting.
   - whether volume-per-acre estimates were overly optimistic.
   - whether sale of timber would generate positive receipts for the U.S. Treasury.

   Key indicators for evaluating the cost-effectiveness of timber harvest include: proportionality analysis, amount of helicopter yarding, timber volume per mile of new road construction, mid-market timber analysis, timber volume per acre, costs of new roads and facilities.

2. **Impact of timber harvest on subsistence use**

   The Alaska National Interest Lands Conservation Act (ANILCA) specifically requires the Forest Service to determine if proposed activities may significantly restrict subsistence use. This issue focuses on the impact of the proposed action on the availability of wildlife, marine life, and plants for customary and traditional use by rural Alaskan residents.

   Examples of public concerns included:
   - whether cumulative effects of more timber harvest on National Forest System lands and Native owned lands would displace subsistence users from traditional areas.
   - whether critical deer winter habitat near communities, especially the Sandy Beach area, would be adversely affected by timber harvest operations.
   - whether timber harvest activities would have adverse effects on subsistence use of deer, fish, and other resources.

- whether access provided by new road construction would open new areas to subsistence users.

Key indicators for evaluating the impacts of timber harvest on subsistence use include: acres of high subsistence use areas harvested; short- and long-term effects on deer habitat capability as it affects abundance and distribution.

3. Impact of timber harvest operations on wildlife habitat

Alaskan wildlife are valuable for aesthetic, economic, ecological, recreational, and subsistence reasons. This issue focuses on the impacts of timber harvest and associated road construction upon wildlife species, particularly those closely associated with landscape-sized tracts of old-growth habitat.

Examples of public concerns included:
- whether additional timber harvest would cause an overall decline in wildlife populations and biological diversity.
- whether timber harvest operations would further fragment existing old-growth habitat.
- whether timber harvest should occur in old growth retention areas identified by the 1989-94 LTS EIS.
- whether road construction and management policy would increase disturbance of wildlife.
- whether timber harvest would have an impact on critical deer winter habitat, especially along the beach fringe.
- whether additional timber harvest along Sandy Beach would endanger population viability of marten and deer in that area.
- whether important wintering trumpeter swan habitat would be affected by timber harvest.
- that the proposed action should be evaluated in light of a long-term wildlife conservation strategy, which should be developed.

Key indicators for evaluating the impacts of timber harvest on wildlife and wildlife habitat include: impacts on habitat capability of Management Indicator Species, as predicted by computer models; acres of wildlife habitat harvested. Forest Plan standards and guidelines are assumed to be in effect.

Figure 1-8 shows the approximate Wildlife Habitat Conservation Areas (HCA's) (as defined by the Interagency Biologist Committee on Viable Populations).

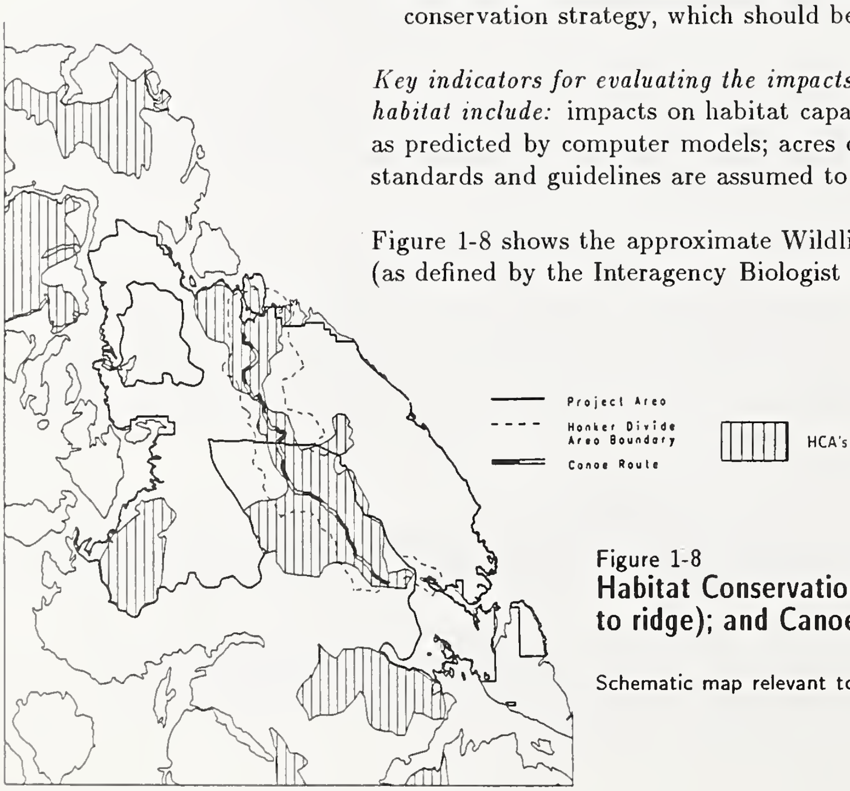


Figure 1-8
Habitat Conservation Areas (HCA's); Honker Divide (ridge to ridge); and Canoe Route

Schematic map relevant to Issue #3, Wildlife, and Issue #4, Honker Divide.

4. Impact of timber harvest operations within Honker Divide

Honker Divide contains high value wildlife habitat and scenic qualities.

The Honker Divide area contains high value habitat for fish and wildlife, as well as recreation opportunities, including a primitive canoe route unique to the region. Parts of the Thorne River–Hatchery Creek system and associated watersheds within this area are recommended by the TLMP Draft Revision (1991a), Alternative P, for designation as Scenic or Recreation rivers under the Wild and Scenic Rivers Act. A map of the eligible Scenic/Recreation River corridors in the Project Area is located in Chapter 3-Recreation.

The exact boundaries of the area known as Honker Divide are not clearly defined or universally accepted. This project defines Honker Divide as including all land drained by the Thorne River-Hatchery Creek system, from Barnes Lake to the Thorne River Bridge. This includes all or portions of VCU's 552, 573, 574, 575, 576 (south), 577 (east), 578, 596, and 597. This issue focuses on the impact of timber harvest operations on the wildlife and recreational values of Honker Divide and other areas of special concern.

The approximate area used to define Honker Divide in this EIS, and the canoe route, are shown on Figure 1-8.

Examples of public concerns included:
- whether timber harvest and road construction would decrease recreational opportunities in Honker Divide.
- whether timber harvest and road construction would decrease wildlife and fishery values in this area.
- whether visual quality along the canoe route and the proposed Scenic/Recreation River corridor would be adversely affected by timber harvest and roads.
- whether Honker Divide should be managed primarily for recreational opportunity, primitive recreation, primitive canoe access, recreation and tourism values.
- whether deferral of all harvest in Honker Divide would severely decrease the timber supply needed for the Long-Term Contract.

Key indicators for evaluating the impacts of timber harvest within Honker Divide include: acres harvested within Honker Divide; acres harvested within the Honker Habitat Conservation Area (HCA) (identified by the VPOP Committee); acres harvested that are visible from the canoe route.

5. Impact of timber harvest operations on fish habitat and water quality

Anadromous and resident fishes are important to sport, commercial, and subsistence users throughout Southeast Alaska. The communities of Thorne Bay and Coffman Cove have municipal water supplies that depend on watersheds within the Project Area for their domestic water source. This issue focuses on the concern for protecting water quality in streams which provide habitat for anadromous and resident fish and which supply water to local communities.

Examples of public concerns included:
- whether timber harvest and road building activities would impair salmon reproduction and survival, especially in the Ratz, Eagle, Hatchery, and Thorne stream systems.
- whether windfirm streamside buffers will be provided and enforced.

- whether the project would cause deterioration of soil and water quality.

Key indicators for evaluating the impacts of timber harvest activities on fish habitat and water quality include: impacts on habitat capability for Management Indicator Species, as predicted by computer models; units with fishery concerns; roads with construction timing requirements; number of stream crossings; harvest of Mass Movement Index (MMI) soils. It is assumed that all relevant BMP's and Forest Plan standards and guidelines are in effect.

6. **Impact of timber harvest operations on visual quality and recreation**

Southeast Alaska's attractive setting is a major focus for a wide range of recreational uses of the region. Prince of Wales Island contains many of the region's outstanding scenic features, and is unique in that recreational opportunities are more accessible by road than elsewhere in Southeast Alaska. This issue focuses on how timber harvest and road-building activities would affect recreation opportunities and the visual character of the landscape.

Examples of public concerns included:
- whether important landscape viewing points would be adequately identified.
- whether decreased visual quality from timber harvest would cause loss of recreation and tourism opportunities.
- whether increased subsistence use would lead to increased competition with sport hunting and fishing.

Key indicators for evaluating the impacts of timber harvest activities on CPOW's visual and recreational resources include: changes in Recreation Opportunity Spectrum (ROS); harvest of roadless areas; harvest in recreation places.

7. **Long-term social and economic stability of local communities**

Local communities depend on timber and other natural resources from the Project Area to support stable economies and lifestyles. This issue focuses on the capability of the Project Area to provide a long-term, sustained flow of timber and other resources, and on whether this associated level of outputs is sufficient to meet the needs of dependent local communities. This issue was evaluated in the Draft EIS in the Socio-Economic sections of Chapters 2 and 3; as a result of substantial public comment it has been analyzed in the Final EIS as a Significant Issue Within the Scope of the Project. It encompasses the concerns expressed in issues #7 (community stability) and #17 (sustained yield) discussed in detail in Appendix D.

Examples of public concern include:
- whether timber harvest in the CPOW Project Area (past, current, and proposed future harvest), in conjunction with timber harvest in immediately adjacent areas, represents a sustainable flow of timber and other resources to local dependent communities.
- whether harvesting at proposed current and future levels will harm the future viability of the local timber industry.
- whether proposed levels of timber harvest will preclude future options for a more diversified economy.

Key indicators for evaluating community stability and the sustainability of the local timber supply include: average annual harvest estimates from the CPOW Project

Area, as well as from the adjacent Lab Bay, Polk Inlet, and Control Lake projects; future trends in timber employment within local communities.

8. **Impact of timber harvest operations on karst ecosystem and cave resources**

Very recently, extensive cave systems and other karst features have been explored and studied on Prince of Wales Island and its outer islands. These caves and karst formations appear to represent a complex ecosystem involving hydrology, fisheries production, high wildlife value, and high timber productivity. In addition, significant cave systems require protection under the Cave Resource Protection Act of 1988 and appear to be areas of high cultural resource significance. Karst formations, because of their high timber productivity, have been heavily affected by timber harvest over the past 30 years. This issue was evaluated in the Draft EIS as a facet of the Fish Habitat and Water Quality issue; as a result of substantial public comment, it is analyzed in the Final EIS as an individual significant issue.

Examples of public concern include:
- whether the remaining unharvested karst ecosystem should be deferred from timber harvest entirely or else planned for a reduced level of harvest until the complex ecological relationships can be more fully studied to determine impacts of timber harvest and road construction.
- what cumulative impacts have occurred and will continue to occur as a result of past and proposed future timber harvest and road construction in karst areas.
- what types of mitigation measures (with special emphasis on Karst Research Group study recommendations) should be used in karst areas planned for harvest.
- whether timber harvest operations would affect subsurface water drainages.

Key indicators for evaluating the impacts of timber harvest activities on caves and karst geology and hydrology included: acres of karst within the Project Area and within proposed harvest units; extent of past harvest on areas of karst formations; correlation between karst occurrence and timber productivity; findings of the Karst Research Group study.

Issues Outside the Scope of this Analysis

The following public issues were considered but eliminated from detailed study because their resolution is beyond the scope of this document.

9. **TLMP Land Use Designations should be changed to eliminate or reduce the level of harvest in specific areas,** such as: Honker Divide, Sarkar, Neck Lake, Mabel Creek, Sweetwater and Barnes Lakes, Rush and Brown mine, Paul Young Creek, and the Whale Pass area.

Land use allocation is a Forest Plan issue. The current revision to TLMP provides a forum for people who wish to see the area managed in a manner that differs from the current direction.

10. CPOW should be delayed until after TLMP revision is complete.

In anticipation of the TLMP Revision, alternatives in this EIS have been developed which are consistent with the standards and guidelines from Alternative P of the TLMP Draft Revision (USDA Forest Service 1991a). Management activities proposed under the alternatives in this EIS are consistent with standards and guidelines of the TLMP Draft Revision.

11. The proposal should increase the Allowable Sale Quantity (ASQ).

Setting the ASQ is a Forest Plan issue and not within the scope of this project.

12. Below-cost timber sales should be eliminated.

Below-cost sales is a national issue and not within the scope of this project. The financial impacts of the alternatives—based on mid-market and current market condition—are displayed in Chapter 3 in this EIS. See also, Appendix D, Response to Public Comments, Issue #14.

13. Regional timber supply and demand should be refigured for the CPOW Project Area.

Timber supply and demand is a regional issue and exceeds the scope of this analysis. A site-specific environmental analysis documents the effects of the proposed activities; it does not constitute the selling or conveyance of property rights. The volume of timber analyzed in any NEPA document may be offered (sold) in part, in whole, or not at all.

The timber offered for sale (timber offerings) may occur in one year or be spread over a three- to five-year period. Therefore, trying to predict the effects of the proposed activities upon the regional timber supply or demand is beyond the capability and scope of this document.

For a complete discussion of all issues and comments expressed during public review of the CPOW Draft EIS, please refer to Appendix D.

Federal and State Permits and Licenses

To proceed with the timber harvest as addressed in this EIS, various permits must be obtained from other Federal and State agencies. The agencies and their responsibilities are listed below.

U.S. Army Corps of Engineers
* Approval of discharge of dredged or fill material into waters of the United States (Section 404 of the Clean Water Act of 1977, as amended).
* Approval of construction of structures or work in navigable waters of the United States (Section 10 of the Rivers and Harbors Act of 1899).

U.S. Environmental Protection Agency
* National Pollutant Discharge Elimination System review (Section 402 of the Clean Water Act of 1977, as amended).

State of Alaska, Department of Natural Resources
* Authorization for occupancy and use of tidelands and submerged lands.

State of Alaska, Department of Environmental Conservation
* Certification of compliance with Alaska Water Quality Standards (Section 401 Certification).
* Solid Waste Disposal Permit (Section 402 of Clean Water Act of 1977, as amended).

U.S. Coast Guard
* Coast Guard Bridge Permit (in accordance with the General Bridge Act of 1946) required for all structures constructed across navigable waters of the United States.

Legislation and Executive Orders Related to This EIS

Shown below is a brief list of laws pertaining to preparation of EIS's on Federal lands. Some of these laws are specific to Alaska, while others pertain to all Federal lands.

National Historic Preservation Act of 1966 (as amended)
Wild and Scenic Rivers Act of 1968
National Environmental Policy Act (NEPA) of 1969 (as amended)
Clean Air Act of 1970 (as amended)
Alaska Native Claims Settlement Act (ANCSA) of 1971
Marine Mammal Protection Act of 1972
Endangered Species Act (ESA) of 1973 (as amended)
Forest and Rangeland Renewable Resources Planning Act of 1974 (as amended)
National Forest Management Act (NFMA) of 1976 (as amended)
Clean Water Act of 1977 (as amended)
American Indian Religious Freedom Act of 1978
Alaska National Interest Lands Conservation Act (ANILCA) of 1980
Archeological Resource Protection Act of 1980
Cave Resource Protection Act of 1988
Tongass Timber Reform Act (TTRA) of 1990
Executive Order 11988 (floodplains), 1990
Executive Order 11990 (wetlands), 1990

Coastal Zone Management Act. In addition to the above laws, the Coastal Zone Management Act (CZMA) of 1976, as amended, pertains to the preparation of an EIS. Federal lands are not included in the definition of the Coastal Zone as prescribed in CZMA. However, the Act requires that when Federal agencies conduct activities or development that affects the Coastal Zone, that agency's activities or development must be consistent to the maximum extent practicable with the approved State Coastal Management Program.

The Alaska Coastal Management Plan incorporated the Alaska Forest Resources and Practices Act of 1979 as applied standards and guidelines for timber harvesting and processing. The Forest Service standards and guidelines and mitigation measures described in Chapter 2 of this document are fully consistent with the State standards.

Availability of Planning Record

An important consideration in preparation of this EIS has been reduction of paperwork as specified in 40 CFR 1500.4 (CEQ 1986). The objective is to furnish enough site-specific information to demonstrate a reasoned consideration of the environmental impacts of the alternatives and how these impacts can be mitigated, without repeating detailed analyses and background information readily available elsewhere. The Planning Record documents the process of producing this EIS. It is available by request under the Freedom of Information Act (FOIA) at the Forest Supervisor's office, Ketchikan, Alaska. Other referenced documents such as the Tongass Land Management Plan, The TLMP Draft Revision, the Tongass Timber Reform Act, the Resources Planning Act, and the Alaska Regional Guide, are available at public libraries around the region as well as at the Supervisor's Office in Ketchikan.

Chapter 2
Alternatives

Outline

Chapter 2

Alternatives

Key Terms

Aquatic Habitat Management Unit (AHMU) - area for managing the resources associated with streams and lakes
Alternative - one of several strategies, plans, or projects proposed for decision making
Best Management Practices (BMP's) - practices used for the protection of water quality
Habitat Conservation Area (HCA) - contiguous blocks of wildlife habitat to be managed and conserved for breeding pairs, connectivity, and distribution of species of concern
Implementation monitoring - collecting information to evaluate whether mitigation measures were carried out in the manner called for
Multi-Entry Layout Plan (MELP) - interdisciplinary design and mapping of all potential timber harvest units, including associated logging and transportation systems
Mitigation - measures designed to counteract or lessen environmental impacts
MMBF - a million board feet
Partial cut - harvest of timber using silvicultural prescription other than clearcut; examples include shelterwood, seed tree, and group selection
Roadless area - an area of undeveloped public land identified by the TLMP Draft Revision
Scoping - activities used to determine the scope and significance of a proposed action (see Chapter 1)
Specified road - road built for long-term management of the Forest as part of a timber sale contract
Subsistence - the customary and traditional uses by rural Alaskan residents of wild renewable resources for direct personal or family consumption
Temporary road - constructed to harvest timber on a one-time basis; closed to vehicular traffic upon completion of timber harvest

Introduction

Chapter 2 outlines the changes made between Draft and Final versions of this EIS. It then summarizes the development of alternative actions for making timber available to the Ketchikan Pulp Company (KPC), while implementing the Tongass Land Management Plan (TLMP) in the CPOW Project Area. It also discusses the alternatives considered but eliminated from detailed study. Finally this chapter

explains and compares the seven alternative actions selected for detailed study. Chapter 2 is intended to provide the decision-maker with a clear basis for choice.

Much of the information in Chapter 2 is summarized from Chapter 3, Environment and Effects. Chapter 3 contains the detailed scientific basis for establishing a baseline and measuring the environmental consequences for each of the alternatives. For the best understanding of the alternatives, readers should consult Chapter 3.

Changes to Alternatives between DEIS and FEIS

There is a considerable refinement in site-specific information available for analysis in the Final EIS (FEIS), compared to what was available at the time the Draft EIS (DEIS) was printed. Refined information has been incorporated into the Final EIS in order to make the proposed harvest units more site specific, as well as to make the units selected for each alternative more closely align with the alternative theme. Appendix E shows how each individual unit changed in response to this refined information.

There are five general sources of this improved information:

- Forest Service field recon;
- Public response to the Draft EIS (approximately 375 responses; see Appendix D);
- Subsistence hearings in eight local communities;
- Updated GIS information;
- Classification of approximately 975 miles of previously unclassifed streams.

In addition to incorporating this refined information, the Final EIS strengthened and expanded many of the discussions contained within the analysis.

Forest Service Field Recon

Within the four action alternatives analyzed in the Draft EIS, 384 units were considered for harvest. During the 1992 field season, the Ketchikan Area performed extensive field reconnaissance (recon) to verify resource information. Approximately 200 units were reviewed in the field for logging feasibility and road location; 167 were examined by the Karst Research Group (see Cave Resources section in Chapter 3) for occurrence of significant karst features; 96 were surveyed for cultural resources; 28 received soil surveys; 14 were examined for fishery concerns; and 35 had stand exams to prepare silvicultural prescriptions. (A number of units were surveyed for multiple resources, so these numbers are not additive.)

The final field verification resulted in changes to unit boundaries, road locations, and planned logging systems. The general overall effect of this site-specific information was to reduce the size and volume available for many of the proposed units. The 384 units considered for harvest in the Draft EIS contained approximately 497 MMBF. This same unit pool was reduced to 363 units considered for harvest in the Final EIS, totaling approximately 407 MMBF. The reasons for the acreage and volume reduction include: unit boundary modifications (103 units, 22 MMBF), deferral of harvest because of resource concerns or because of conflict with environmental regulations (22

units, 31 MMBF), and reduced harvest yield from non-clearcut silvicultural systems (45 units, 16 MMBF).

Public Response, Including Subsistence Hearings

After reviewing the specific areas proposed for harvest in the Draft EIS, the public identified numerous areas where they would prefer to defer harvest for various resource reasons, including subsistence. An alternative was developed (Alternative F6) which deferred harvest in all those areas where the public expressed concern. In addition, public input was used to identify which units are best able to address various significant issues. For example, units identified for helicopter yarding were deferred for harvest under Alternative F3, and areas identified as having high wildlife significance were deferred from harvest in Alternative F2.

Improved GIS Information

Numerous small mapping errors were discovered where small slivers of units intruded into areas that were supposed to be deferred from harvest, such as existing clearcuts and buffers for TTRA streams, estuaries, and the beach fringe. These intrusions were largely the result of mapping errors and generally were less than two acres in size. While the magnitude of these refinements was not very significant for any individual unit, they did account for a reduction of approximately 6 MMBF spread over 65 units.

In addition, a model was developed to incorporate the riparian prescription standard and guideline proposed by Alternative P of the TLMP Draft Revision. This model identified areas (in addition to TTRA buffers) which were prescribed for no-harvest, and partial cut harvest. These identified areas were incorporated into the CPOW MELP and used to redesign the unit configuration and potential timber harvest yield.

In conjunction with the "as-built" appraisal to revise contract stumpage rates for harvest units released to KPC under the 1989-94 LTS EIS, the GIS clearcuts layer was refined. These refinements displayed the modifications that occurred to the 1989-94 harvest units as they evolved from planned configuration to actual harvest. Some other corrections were also applied to the clearcuts layer as a result of analysis using the new 1991 aerial photos. This new clearcuts layer replaces the one used for analysis in the Draft EIS. It shows 78,526 acres of existing clearcuts, while the previous layer showed 81,709 acres.

Improved Streams Information

The CPOW MELP identified approximately 975 miles of potential streams within the Project Area that had not been previously mapped. These streams were identified from topographic maps and aerial photos, but were not field verified. Between the Draft and Final EIS, a team of fisheries biologists reviewed these streams and made a preliminary determination of stream classification and channel type. The IDT incorporated this new stream information into predicted unit size and harvest yield, but did not reconfigure the unit boundaries. These streams are not shown on the unit card maps or on the alternative maps in the map packet. For instance, assume a 50-acre unit contained a newly classified Class I stream, which would require 5 acres of no harvest TTRA buffer and 3 acres of partial cut harvest for riparian management. All analyses of that unit within the Final EIS would evaluate harvest acreage and volume associated with 42 acres of clearcut and 3 acres of partial cut, but the unit card map would show the entire 50 acres.

Improved Analysis

Based on public and internal comment, the resource analysis within the Final EIS represents a marked improvement of what was presented in the Draft EIS. The following summarizes some of the more significant revisions by resource. The FEIS:

Timber

- replaces MELP timber supply estimates with timber supply identified by TLMP Draft Revision;
- updates mid-market economic analysis to include shovel logging and revised helicopter yarding costs;
- for comparison purposes, shows how mid-market values relate to stumpage values computed from current costs;
- refines harvest volume calculations to reflect non-clearcut silvicultural treatments;
- incorporates refined GIS coverage for previously harvested areas;
- improves discussion on silvicultural treatments;
- improves unit card maps;
- expands harvest data and Appendix A to include information on completion of first rotation through year 2050, instead of 2004;
- expands timber supply analysis to include adjacent projects—Lab Bay and Control Lake.

Wildlife

- displays Viable Population Committee's recommendations and displays Habitat Conservation Areas (HCA's);
- displays effects of proposed Access Management Plan;
- displays cumulative effects from adjacent Lab Bay and Polk Inlet project areas;
- deer analysis considers effect of increased hunter demand on deer availability and displays ADFG population objectives;
- assumes a sustainable harvest rate of 40 percent for marten and 20 percent for river otter;
- adds gray wolf to MIS list;
- incorporates the effects of road densities and patch size effectiveness in the analysis, as well as deferral of harvest within the beach and estuary buffers;
- includes Appendix B, Biological Assessment.

Soil, Water, Air

- recalculates cumulative effects for watershed disturbance, on a third order watershed basis instead of on a more generic VCU basis;
- discusses water quality changes resulting from operation of KPC mill in Ward Cove;

Community Stability

- shows future timber supply by LTF;
- adds community stability to the list of significant issues;
- improves socio-economic section;
- displays employment trends for timber and other industries;

Geology, Including Karst

- adds karst management to list of significant issues;
- displays extent of known and potential karst areas;
- displays cumulative effects for timber harvest on known karst areas;
- expands discussion of interrelationships within karst ecosystem and how components are affected by timber harvest;
- expands minerals discussion.

Alternative Development

Each action alternative presented in this EIS is a different response to the significant issues discussed in Chapter 1. For this EIS, five action alternatives were developed in detail to meet the stated purpose and need of the project, while minimizing or avoiding environmental impacts. Each action alternative represents a site-specific proposal developed through intensive interdisciplinary unit and road design using field recon, high resolution topographic maps, GIS mapping capabilities, and new 1991 aerial photos (see Appendix C).

Prior to commencement of scoping for this project, logging and transportation engineers and resource specialists developed a detailed Multi-Entry Layout Plan (MELP) that was specific to the CPOW Project Area and consistent with TLMP (1979a, as amended) and the TLMP Draft Revision (1991a). This MELP was based on the previous logging and transportation plan, high resolution topographic maps, 1979 and 1991 aerial photos, available GIS information, and site-specific on-ground knowledge. This plan identified harvest unit boundaries, road systems, and resource concerns for the suitable-available commercial forest land in the Project Area that was determined by the IDT to be operable and capable of meeting TLMP Draft Revision Alt P standards and guidelines, and that met minimum economic criteria. These units included harvest units planned for helicopter. For a more detailed description of the MELP, refer to Chapter 3, Timber.

Initial scoping for the CPOW project began in September 1991. The results of scoping and subsequent public comment on the Draft EIS were used to finalize the significant issues described in detail in Chapter 1. The Interdisciplinary Team (IDT) reviewed each significant issue and summarized all associated public comments. This review led to development of ranges of solutions for each issue, which became the emphases for alternate ways to design and disperse timber harvest activities throughout the Project Area to meet the stated purpose and need of CPOW.

Each action alternative was designed to respond specifically to all the significant issues to various degrees. Additionally, each action alternative would meet, as closely as possible, the stated purpose and need for the project and could prudently be implemented as a viable, reasonable alternative. As these emphases became consolidated and refined, they evolved into the five action alternatives discussed in the Alternatives Considered section of this chapter.

In December 1991, the Interdisciplinary Team (IDT) developed criteria for deciding which timber harvest units from the 1991 MELP could most effectively meet the framework of the individual alternatives. Once the unit selection criteria were developed, the IDT began the process of assigning individual harvest units to the respective alternatives.

"All units proposed for harvest by any alternative in the Final EIS were proposed for harvest by at least one of the alternatives in the Draft EIS."

In February 1992, Forest Service logging systems specialists, field engineers, and Thorne Bay Ranger District presale timber personnel reviewed each proposed unit and made recommended modifications to the proposed harvest and transportation systems based upon site-specific knowledge of on-ground conditions. These changes were incorporated into the MELP, as well as into the assignment of units to the action alternatives. A field assessment of harvest units was initiated in fall 1991 and continued into the 1992 field season. Results of field reconnaissance are incorporated into the Final EIS.

Responses on the CPOW Draft EIS were received from approximately 375 individuals, agencies, and organizations. Subsistence hearings were held in eight local communities to determine how the public felt the project would affect their subsistence activities. Public response, including subsistence testimony, was incorporated into alternative development.

Alternatives for the Final EIS were initially developed by the IDT by applying recon information and public comment to the alternatives proposed in the Draft EIS. This information was used to make site-specific changes to individual harvest units, as well as to determine whether the proposed harvest unit still matched the framework of the alternative. In most cases it was then necessary to add additional units to the alternatives to replace deferred volume. The additional harvest units were selected from the units proposed for harvest in the Draft EIS which met the framework of the alternatives. All units proposed for harvest by any alternative in the Final EIS were proposed for harvest by at least one of the alternatives in the Draft EIS.

Because of the expanse and depth of public comment, the IDT developed a new alternative (not analyzed in the Draft EIS) whose sole focus was to respond to site-specific public comment. This became Alternative F6.

The preferred alternative (F5) was developed by the Forest Service based on Alternative 5 from the Draft EIS, which was modified to respond to public comments and to emphasize ecosystem management principles.

Items Common to All Alternatives

- Each action alternative will meet the stated purpose and need of the project, which is to make approximately 290 MMBF of timber available from the CPOW Project Area to KPC as part of the Long-Term Contract. "Approximately" for this project was interpreted to mean within 10 percent (261–319 MMBF). Each alternative will comply with Forest Service planning documents such as the 1990 RPA, the Alaska Regional Guide, and the TLMP as amended, and will be consistent with the provisions of the TLMP Revision.

- All units meet visual quality objectives (VQO's) proposed for this project.

- All alternatives comply with Sec.301(c)(2) of the Tongass Timber Reform Act (TTRA), which states that the Forest Service shall:

"eliminate the practice of harvesting a disproportionate amount of old-growth timber by limiting the harvest over the rotation in volume classes 6 and 7, as defined in TLMP and supporting documents, so that the proportion of volume harvested in these classes within a contiguous management area does not exceed the proportion of volume currently represented by these classes within the management area."

Each alternative meets this legal requirement, within the tolerances specified in Forest Service Handbook (FSH) 2409.18, Region 10 Supplement No. 2409.18-92-5, for every management area within the CPOW Project Area, except for K03. It is expected the proportionality departure in this management area will be corrected by harvest being analyzed by the Lab Bay project, which contains the bulk of K03. There is also a slight proportionality departure in management area K07 for alternatives F2, F3, and F4, but this departure is within the tolerance specified in the FSH.

No alternative proposes timber harvest on any lands which are currently selected by, but as yet unconveyed to, Native corporations or by the State of Alaska.

- All alternatives comply with Sec.103(e) of TTRA which states that the Forest Service shall:

  "...maintain a buffer zone of no less than 100 feet in width on each side of all Class I streams in the Tongass National Forest, and on those Class II streams which flow directly into Class I streams, within which commercial timber harvesting shall be prohibited...."

- Each alternative includes the standards, guidelines, and land allocations of TLMP as amended in 1986 and 1991.

- CPOW was developed in accordance with the standards and guidelines of Alternative P of the TLMP Draft Revision (1991a):

  - Each individual unit proposed for harvest by any of the action alternatives meets the TLMP Draft Revision standards and guidelines for riparian management of all streams within the GIS database. These guidelines provide for additional no-harvest stream buffers (other than required by TTRA), areas of no-programmed harvest, and areas prescribed for uneven-aged management.
  - No timber will be harvested within either the 500-foot shoreline buffer or the 1,000-foot estuarine buffer.
  - Collectively all units meet the TLMP Draft Revision objectives to provide sufficient wildlife habitat to contribute to the maintenance of viable populations of wildlife species.

- There are numerous proposed harvest units that are planned to exceed 100 acres and several that exceed 150 acres. Individual harvest units that were designed to be greater than 100 but less than 150 acres were done in compliance with current regional direction in the Alaska Regional Guide which states that:

  "100 acres is the maximum size of created openings to be allowed for the hemlock-Sitka spruce forest type of coastal Alaska, unless excepted under specific conditions. Recognizing that harvest units must be designed to accomplish management goals, created openings may be larger where larger units will produce a more desirable contribution of benefits."

This statement is designed to comply with legal limitations imposed on maximum size of created opening size as specified by the National Forest Management Act of 1976 (NFMA). The specific conditions listed in the Alaska Regional Guide include considerations for topography, condition of adjacent openings, effects on water quality or quantity, effects on wildlife and fish habitat, regeneration requirements, transportation, economic considerations, and harvest system requirements. Also addressed are natural and biological hazards such as windthrow, insect or disease problems, and visual absorption capacity. Any unit or combination of units more than 150 acres in size for this project requires approval of the Regional Forester (see Table 3-36 in the Timber/Vegetation section of Chapter 3).

There are three proposed 'clusters' of units that exceed 100 acres in size as a result of logging and transportation system requirements; these units will remain as planned. All other harvest units that create openings in excess of 100 acres will be divided into smaller, non-contiguous openings by application of mitigation measures such as partial cutting, expansion of widths of stream buffers, and leave islands and/or wildlife travel corridors. These mitigation measures will be prescribed on the unit cards (see Appendix G). The benefits to wildlife and biodiversity of these islands and leave strips were not incorporated into wildlife models and biodiversity discussions. These mitigation measures may decrease impacts to these resources. Similarly, reduced harvest acres and volumes were not quantified. Implementation and effectiveness monitoring will follow the progress of these activities.

- The TLMP Draft Revision has identified portions of the Thorne River System, including Hatchery Creek, as being eligible for consideration under the Wild and Scenic Rivers Act. CPOW has deferred timber harvest on an estimated 11,276 acres within this river system. All alternatives will maintain its eligibility for inclusion in the nationbal Wild and Scenic River System to its highest possible classifications.

- All timber proposed for harvest for each of the alternatives can be transported to existing log transfer facilities (LTF) at Thorne Bay, Coffman Cove, Whale Pass, Naukati, and Winter Harbor. No new LTF's are proposed for any of the alternatives.

"Ecosystem management opportunities are being developed and are incorporated into the alternatives."

- Ecosystem management opportunities are being developed and are incorporated into the alternatives. Some of the activities that are responsive include:

  - riparian management
  - deferral of harvest within areas of significant karst features
  - snag patches
  - wildlife islands within clearcuts
  - maintenance of large, unfragmented blocks of old-growth forest
  - partial cuts for maintenance of visual quality
  - shelterwood harvest to maintain cedar component
  - seed tree harvests to improve regeneration
  - uneven-aged management within certain riparian areas.

- No alternative proposes to harvest timber from Stevenson Island because of economic, visual, and cultural resource concerns.

- During the IDT development of the MELP, proposed units were identified which appeared to include portions of unstable slopes where soils could be very highly

susceptible to landslides. Because the suitability classification of the TLMP Draft Revision (1991a) precludes timber harvest in such areas, the CPOW project has deferred timber harvest in these identified areas (which totaled 7,741 acres), until such time as field reconnaissance can make a conclusive determination on slope stability. These units are still in the MELP.

- During the process of assigning units to the various alternatives, the IDT selected only those individual units or groups of units that met certain minimum feasibility standards. These feasibility standards included minimum unit size (10 acres), high probability of being harvested with the proposed logging plan, and a minimum one MMBF per mile of new road construction (as a timber economics indicator).

Alternatives Eliminated from Detailed Study

Alternative A

Several public comments received during scoping requested the Forest Service provide a higher level of timber outputs from the CPOW Project Area during this planning period. The IDT developed an alternative which considered harvest of all units proposed in every alternative. The only reason for eliminating any unit under this alternative was to comply with NFMA constraints on maximum size of harvest units. The focus of this alternative was to analyze the maximum amount of timber that could be harvested from the Project Area at this time, while meeting all standards and guidelines and environmental regulations.

Alternative A proposed to harvest 303 individual harvest units, totaling 353 MMBF of sawlog plus utility volume from 12,890 acres. It proposed 76 MMBF scheduled for helicopter yarding.

Alternative A was dropped from consideration because it exceeded the stated purpose and need for the project by 63 MMBF.

Alternative B

Numerous public comments requested the Forest Service reduce the level of timber outputs from the CPOW Project Area during this planning period. Many of the commenters questioned if harvest could be sustained within the Project Area throughout the rotation. The Forest Service's position is that sustainability of resource outputs is to be maintained at the Forest level and not at the project level. But in response to public input, the IDT used the TLMP Draft Revision to assess 'sustained' levels of harvest within the area. This analysis is displayed in the Timber section of Chapter 3, and indicates that harvest levels can be sustained both on the Ketchikan Area as a whole, and within the northern part of Prince of Wales Island.

In response to the issue of reduced harvest levels, the IDT developed an alternative which avoided harvest in the following areas: Habitat Conservation Areas (HCA's) identified by the Interagency Viable Population Committee, high-use subsistence areas, areas with significant karst features, areas managed under the 1989-94 LTS EIS to provide old-growth habitat, areas adjacent to Sarkar and non-National Forest System land, areas within goshawk post-fledgling territories, harvest units with soils concerns, and all specific units where the public requested harvest be deferred. Harvest units were selected to maximize areas that had received field reconnaissance, to achieve at least 1.5 MMBF of harvest per mile of new road construction, to provide closely

grouped offering areas to minimize forest fragmentation, and to provide offering areas to each log dump.

Alternative B proposed to harvest 54 individual harvest units, totaling 70 MMBF of sawlog plus utility volume from 2,454 acres. It proposed 21 MMBF scheduled for helicopter yarding.

Alternative B was dropped from consideration because it failed to meet the stated purpose and need for the project by 220 MMBF. More information on why lower volumes were not considered is included in Appendix A.

Alternatives C, D, and E

These alternatives were presented to the public in April 1992 as Alternatives 2, 3, and 4, respectively. They all proposed to harvest less than the volume required by the stated purpose and need, proposing harvest levels that were 269, 242, and 232 MMBF, respectively. These alternatives were reduced to 220, 205, and 189 MMBF respectively after incorporating the recon information. They were eliminated from detailed study because they failed to meet the stated purpose and need by 70, 55, and 101 MMBF respectively.

Alternative F

This alternative was originally presented in the Draft EIS as Alternative 3. For the Final EIS, it was modified to incorporate refined site-specific information. It also proposed deferral of harvest in specific areas identified by public comments and subsistence testimonies as important subsistence use areas.

As modified, Alternative F proposed to harvest 146 individual harvest units, totaling 177 MMBF of sawlog plus utility volume from 6,473 acres. It proposed 56 MMBF scheduled for helicopter yarding.

Alternative F was dropped from further consideration because it failed to meet the stated purpose and need for the project by 113 MMBF. More information on why lower volumes were not considered is included in Appendix A.

Alternative G

This alternative used Alternative 4 from the Draft EIS as a baseline and considered deferral of harvest in all units which Ketchikan Pulp Co. (KPC) expressed concern with harvest. Most of their concern was related to timber economics.

Alternative G proposed to harvest 193 individual harvest units, totaling 222 MMBF of sawlog plus utility volume from 7,897 acres. It proposed no helicopter yarding.

Alternative G was dropped from consideration because it failed to meet the stated purpose and need for the project by 68 MMBF. More information on why lower volumes were not considered is included in Appendix A.

Alternative H

This alternative used Alternative A as a baseline and considered deferral of harvest in all units which the Alaska Department of Fish and Game expressed concern with

harvest. Most of their concern was related to forest fragmentation and loss of wildlife habitat.

Alternative H proposed to harvest 232 individual harvest units, totaling 278 MMBF of sawlog plus utility volume from 9,926 acres. It proposed 76 MMBF planned for helicopter yarding.

Alternative H was dropped from consideration at the request of the State of Alaska since they did not intend their comments to be considered as a full alternative.

Alternatives Considered for Detailed Study

Seven alternatives for making timber available to KPC from the CPOW Project Area were considered in detail. For each alternative this section provides a discussion of: (1) the emphasis or intent of the alternative, (2) various resource outputs associated with implementation, (3) environmental consequences, and (4) guidelines used in selecting units and roads consistent with the emphasis. Alternatives are compared in detail later in this chapter and summarized in Table 2-1.

Alternative 1 (No Action)

Emphasis. The emphasis of this alternative is to propose no new timber harvest from the CPOW Project Area for the Long-Term Contract at this time. It does not preclude timber harvest from other areas at this time, or from the CPOW Project Area at some time in the future. It does not preclude harvest of units analyzed under previous NEPA documents but not yet felled as of the CPOW ROD. NEPA requires a "No Action" alternative be analyzed in every EIS to serve as a benchmark by which effects of the other action alternatives are to be measured; this alternative provides that benchmark. The Existing Condition map, in the separate map packet, shows the distribution of vegetation associated with no new timber harvest.

Outputs. There are no new timber harvest outputs associated with this alternative, including timber receipt returns to the State of Alaksa.

Consequences. There would be no new harvest within high-use subsistence areas identified by the Tongass Resource Use Cooperative Survey (TRUCS) or by public comment and subsistence hearings in relation to CPOW. Current subsistence use patterns could continue. There would be no new harvest within Honker Divide, or within old-growth habitat or extended rotation areas identified by the 1989-94 LTS EIS. The habitat capability for black-tailed deer associated with this alternative is an estimated 10,245 deer. There would be 74,061 acres of old-growth forest within blocks over 10,000 acres. Changes in visual conditions would be attributable only to natural processes, and there would be no timber harvest adjacent to recreation places. There would be no harvest of volume class 4/5 timber in management area K03, which could be used to help bring proportionality within tolerances prescribed by the Forest Service Handbook (FSH). There would be no new timber related employment associated with the Long-Term Contract. When harvest of units offered under the 1989-94 ROD are completed, loggers working in the Project Area would either be out of work or else displaced to other areas.

Guidelines. There were no units selected for this alternative.

Alternative 1a (No Action/No Harvest)

Emphasis. The emphasis of this alternative is to propose complete cessation of all timber harvest activities in the Project Area, including any areas analyzed under previous NEPA documents but not yet felled as of the date of the CPOW ROD. These previously analyzed areas include harvest units totaling approximately 1,000 acres and 30 MMBF analyzed under the 1989-94 LTS EIS, and approximately 25 acres and 0.48 MMBF analyzed for independent timber sales. This alternative does not preclude timber harvest from other areas at this time, or from the CPOW Project Area at some time in the future. This alternative serves as a further benchmark by which to measure the effects of the other alternatives.

Figure 2-1 shows the location of NEPA-approved harvest units that are projected to be unharvested as of the date of the CPOW ROD and from which timber harvest operations would be cancelled.

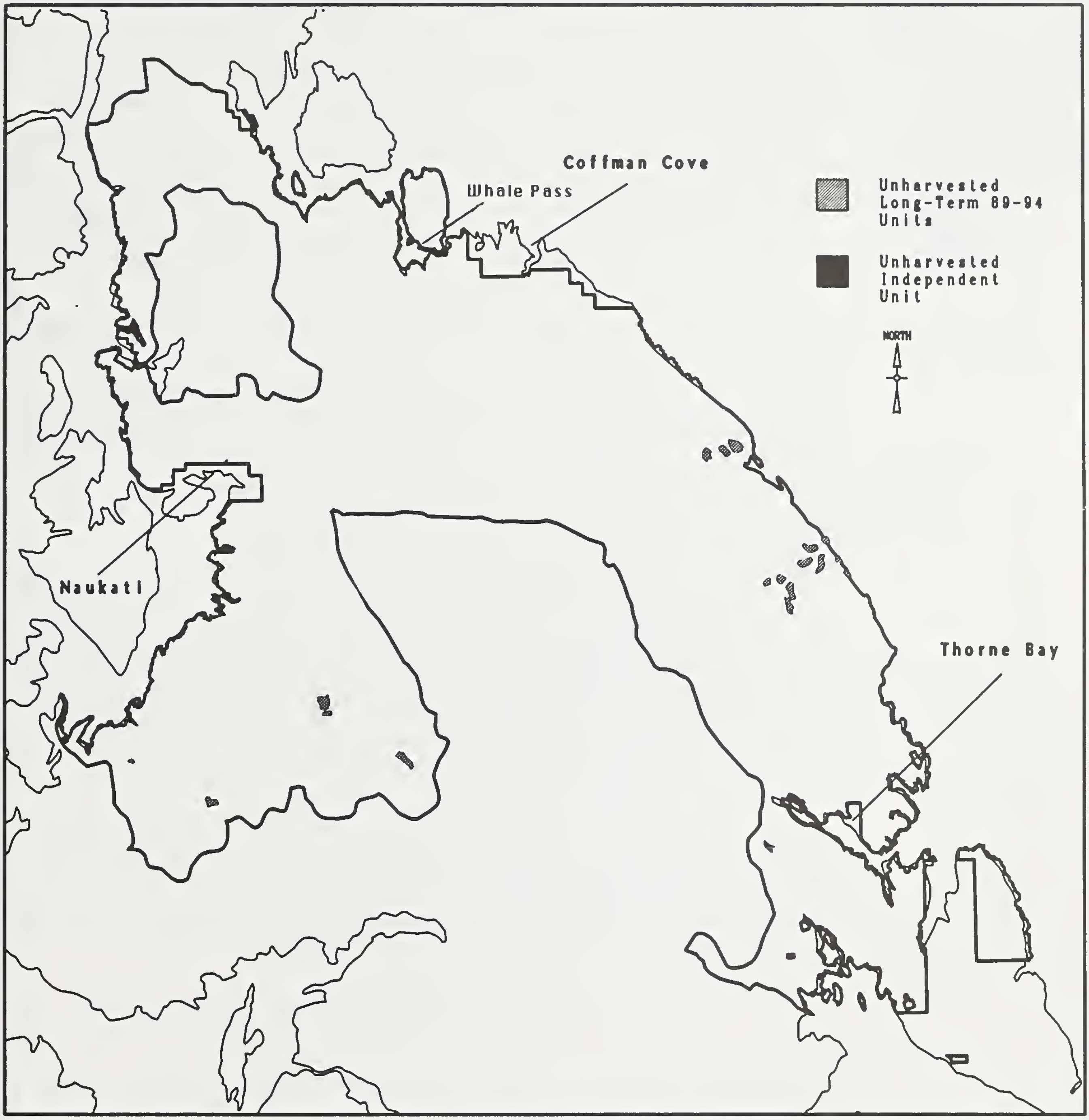
Outputs. There are no timber harvest outputs associated with this alternative, including timber receipt returns to the State of Alaksa.

Consequences. There would be no harvest within high-use subsistence areas identified by the TRUCS or by public comment and subsistence hearings in relation to CPOW. Current subsistence use patterns could continue. There would be no harvest within Honker Divide, or within old-growth habitat or extended rotation areas identified by the 89-94 LTS EIS. The habitat capability for black-tailed deer associated with this alternative is an estimated 10,280 deer. There would be 74,061 acres of old-growth forest within blocks over 10,000 acres. Changes in visual conditions would be attributable only to natural processes, and there would be no timber harvest adjacent to recreation places. Starting in April 1993, there would be no timber related employment from this Project Area until a ROD from a future NEPA project authorizes additional timber harvest. There would be no harvest of volume class 4/5 timber in management area K03, which could be used to help bring proportionality within tolerances prescribed by the Forest Service Handbook (FSH). Loggers working in this Project Area would either be out of work or else displaced to other areas. There would likely be substantial financial claims against the Forest Service based upon cancellation of timber harvest operations within previously offered harvest units.

Guidelines. There were no units selected for this alternative.

There would be 74,061 acres of old-growth forest in blocks of 10,000 acres under the no-action alternatives.

Figure 2-1
Long-Term Contract and Independent Units Projected to be Unharvested as of CPOW ROD Date



Alternative F2

Emphasis. The emphasis of this alternative (shown as Alternative 2 in the Draft EIS) is to meet the defined purpose and need while configuring planned harvest units throughout the Project Area to reduce harvest of high value wildlife habitat and to maintain the integrity of the Habitat Conservation Areas (HCA's) proposed by the Viable Population Committee. This includes the 90,000-acre Honker Divide HCA (34,000 acres of which lie within the CPOW Project Area), and the 23,000-acre Staney Creek HCA. This approach emphasizes a deferral of harvest within valuable wildlife habitats and seeks to minimize the effects of forest fragmentation. This alternative focuses on harvest of areas already roaded or close to existing roads, thereby minimizing timber entry into unroaded areas. The Alternative F2 map, in the separate map packet, shows the harvest units and associated roads proposed by this alternative in relation to physical and geographic features of the Project Area.

Alt.F2 reduces harvest of high value wildlife habitat and maintains integrity of two HCA's.

Outputs. Alternative F2 schedules the harvest of 228 individual harvest units, totaling 264 MMBF of sawlog plus utility volume from 9,373 acres. Of this harvest, 20 units totaling 23 MMBF and 976 acres are planned for partial cut; the remainder are planned for clearcut harvest. Also included are approximately 4 MMBF of right-of-way volume associated with new road construction. This alternative requires the construction of 110 miles of new specified roads plus 4 miles of temporary roads. It proposes 60 MMBF scheduled for helicopter yarding and on the remaining units achieves 1.85 MMBF per mile of specified road consruction. Economic analysis indicates a net mid-market stumpage value of $3.29 per MBF.

Consequences. Of the 9,373 acres proposed for timber harvest, some is planned within high-use subsistence areas, as identified by the Tongass Resource Use Cooperative Survey (TRUCS) (2,830 acres) and by public comment/subsistence hearings in relation to CPOW (1,655 acres). There are 566 acres of harvest within the ridge-to-ridge definition of Honker Divide, and harvest within the HCA's identified by the Viable Population (VPOP) Committee–the Honker Divide HCA (79 acres) and the Staney Creek HCA (47 acres). Harvest is also planned within extended rotation (458 acres) and old-growth habitat (1,654 acres) areas identified by the 1989-94 LTS EIS.

This alternative has the habitat capability to support an estimated 9,934 deer. It maintains 70,217 acres of old-growth forest in 10,000-acre blocks. Alternative F2 results in a shift of approximately 19,000 acres from Semiprimitive Non-Motorized (SPNM) to Roaded Modified (RM), based upon the Recreation Opportunity Spectrum. This alternative will provide an annual average of 572 timber-related jobs over a four-year period.

Guidelines. Guidelines used in selecting units and roads which would be consistent with the emphasis of Alternative F2 include the following:

Minimize timber harvest within all known goshawk habitat management areas.

Minimize timber harvest within the HCA's identified by the Viable Population Committee, including the HCA within Honker Divide and the smaller HCA in the Staney Creek area. Much of this area is high value habitat for wildlife species thought to be associated with large blocks of old-growth forest.

Defer harvest within individual units which were identified during field recon as having high local use by wildlife.

Minimize forest fragmentation in other areas by concentrating timber harvest adjacent or in close proximity to existing roads.

Alternative F3

Emphasis. The emphasis of this alternative (shown as Alternative 4 in the Draft EIS) is to meet the stated purpose and need while configuring planned harvest units throughout the Project Area with an increased focus on providing economic viability for this timber entry. This alternative does not propose any helicopter timber harvest. This approach emphasizes positive net economic return to the U.S. Treasury and to KPC for the proposed harvest units, by seeking to minimize logging and road costs. This alternative focuses on harvest of units where the timber volume per acre is relatively high (subject to TTRA proportionality constraints) and where the harvested volume approximates 2.0 MMBF per mile of new road construction. The Alternative F3 map, in the separate map packet, shows the harvest units and associated roads proposed by this alternative in relation to physical and geographic features of the Project Area.

Helicopter logging is deferred in Alt.F3 to provide greater economic viability for this timber entry.

Outputs. Alternative F3 schedules the harvest of 241 individual harvest units, totaling 260 MMBF of sawlog plus utility volume from 9,519 acres. Of this harvest, 19 units totaling 18 MMBF and 832 acres are planned for partial cut; the remainder are planned for clearcut harvest. Also included are approximately 4 MMBF of right-of-way volume associated with new road construction. This alternative requires the construction of 135 miles of new specified roads plus 11 miles of temporary roads. It proposes no units scheduled for helicopter yarding and achieves 1.92 MMBF per mile of specified road consruction. Preliminary analysis indicates a net mid-market stumpage value of $2.41 per MBF.

Consequences. Of the 9,519 acres proposed for timber harvest, some is planned within high-use subsistence areas, as identified by the TRUCS (2,726 acres) and by public comment/subsistence hearings in relation to CPOW (3,428 acres). There are 1,194 acres of harvest within the ridge-to-ridge definition of Honker Divide, and harvest within the HCA's identified by the VPOP Committee–the Honker Divide HCA (1,806 acres) and the Staney Creek HCA (318 acres). Harvest is also planned within extended rotation (337 acres) and old-growth habitat (2,718 acres) areas identified by the 1989-94 LTS EIS.

This alternative has the habitat capability to support an estimated 9,952 deer. It would maintain 69,365 acres of old-growth forest in 10,000-acre blocks. Alternative F3 would result in a shift of approximately 15,800 acres from Semiprimitive Non-Motorized to Roaded Modified, based upon the Recreation Opportunity Spectrum. This alternative would provide an annual average of 574 timber-related jobs over a four-year period.

Guidelines. Guidelines used in selecting units and roads which would be consistent with the emphasis of Alternative F3 include the following:

Defer timber harvest in units scheduled for helicopter yarding.

Confine timber harvest to units which average more than 20 MBF per acre.

Select groups of harvest units which are planned to achieve 2.0 MMBF of yarded volume per mile of new road construction.

Alternative F4

The emphasis of Alt.F4 is to provide economically viable timber harvest while maintaining the integrity of the Honker Divide HCA.

Emphasis. The emphasis of this alternative (shown as Alternative 5 in the Draft EIS) is to meet the defined purpose and need by configuring planned harvest units throughout the Project Area to provide for economically viable timber harvest and to maintain the integrity of the HCA block within Honker Divide. This approach emphasizes a positive net economic return for the proposed harvest units, while seeking to minimize the effects of forest fragmentation. This alternative focuses on harvest of higher volume stands (within TTRA proportionality constraints) which can provide a favorable ratio of yarded volume to mile of new road construction, while deferring harvest within the largest unroaded blocks of old-growth forest. The Alternative F4 map, in the separate map packet, shows the harvest units and associated roads proposed by this alternative in relation to physical and geographic features of the Project Area.

Outputs. Alternative F4 schedules the harvest of 223 individual harvest units, totaling 258 MMBF of sawlog plus utility volume from 9,180 acres. Of this harvest, 21 units totaling 24 MMBF from 1,040 acres are planned for partial cut; the remainder are planned for clearcut harvest. Also included are approximately 3 MMBF of right-of-way volume associated with new road construction. This alternative requires the construction of 104 miles of new specified roads plus 8 miles of temporary roads. It proposes 57 MMBF scheduled for helicopter yarding and on the remaining units achieves 1.93 MMBF per mile of specified road consruction. Preliminary analysis indicates a net mid-market stumpage value of $1.03 per MBF.

Consequences. Of the 9,180 acres proposed for timber harvest, some is planned within high use subsistence areas, as identified by the TRUCS (2,577 acres) and by public comment/subsistence hearings in relation to CPOW (1,901 acres). There are 414 acres of harvest within the ridge-to-ridge definition of Honker Divide and harvest within the HCA's identified by the VPOP committee–the Honker Divide HCA (123 acres) and the Staney Creek HCA (422 acres). Harvest is also planned within extended rotation (401 acres) and old-growth habitat (1,892 acres) areas identified by the 1989-94 LTS EIS.

This alternative has the habitat capability to support an estimated 9,942 deer. It maintains 70,148 acres of old-growth forest in 10,000-acre blocks. Alternative F4 results in a shift of approximately 16,000 acres from Semiprimitive Non-Motorized to Roaded Modified, based upon the Recreation Opportunity Spectrum. This alternative will provide an annual average of 570 timber-related jobs over a four-year period.

Guidelines. Guidelines used in selecting units and roads which would be consistent with the emphasis of Alternative F4 include the following:

Minimize timber harvest within the HCA block within Honker Divide.

Minimize timber harvest within the nest and post-fledging area of all known goshawk management areas.

Confine timber harvest to units which average more than 20 MBF per acre.

Select groups of harvest units which are planned to exceed 1.5 MMBF of yarded volume for every mile of new road construction.

Alternative F5 (Preferred Alternative)

Alt.F5 is the Forest Service preferred alternative and emphasizes ecosystem management principles.

Emphasis. This alternative is designed to meet the defined purpose and need while emphasizing ecosystem management principles. These principles include reduced use of clearcutting; establishment of an area (adjacent to the Sarkar Lakes Primitive Recreation Area) emphasizing uneven-aged management; incorporation of ecosystem management principles; and reduction of forest fragmentation by minimizing harvest in the Honker Divide HCA. This approach emphasizes a positive net economic return for the proposed harvest units, although the Offering Area devoted to ecosystem management principles may show less return. The Alternative F5 map, in the separate map packet, shows the harvest units and associated roads proposed by this alternative in relation to physical and geographic features of the Project Area.

Outputs. Alternative F5 schedules the harvest of 237 individual harvest units, totaling 264 MMBF of sawlog plus utility volume from 9,836 acres. Of this harvest, 37 units totaling 30 MMBF from 1,579 acres are planned for partial cut; the remainder are planned for clearcut harvest. Also included are approximately 3 MMBF of right-of-way volume associated with new road construction. This alternative requires the construction of 100 miles of new specified roads plus 5 miles of temporary roads. It proposes 69 MMBF scheduled for helicopter yarding and on the remaining units achieves 1.95 MMBF per mile of specified road consruction. Preliminary analysis indicates a net mid-market stumpage value of $3.83 per MBF.

Consequences. Of the 9,836 acres proposed for timber harvest, some is planned within high-use subsistence areas, as identified by the TRUCS (2,800 acres) and by public comment/subsistence hearings in relation to CPOW (1,519 acres). There are 436 acres of harvest within the ridge-to-ridge definition of Honker Divide, and harvest within the HCA's identified by the VPOP Committee–the Honker Divide HCA (129 acres) and the Staney Creek HCA (831 acres). Harvest is also planned within extended rotation (378 acres) and old-growth habitat (1,639 acres) areas identified by the 1989-94 LTS EIS.

This alternative has the habitat capability to support an estimated 9,918 deer. It would maintain 70,620 acres of old-growth forest in 10,000-acre blocks. Alternative F5 would result in a shift of approximately 19,600 acres from Semiprimitive Non-Motorized to Roaded Modified, based upon the Recreation Opportunity Spectrum. This alternative would provide an annual average of 583 timber-related jobs over a four-year period.

Guidelines. Guidelines used in selecting units and roads which would be consistent with the emphasis of Alternative F5 include the following:

Minimize timber harvest within large, unfragmented old-growth blocks.

Minimize timber harvest within the HCA block within Honker Divide.

Defer harvest in the Paul Young Creek drainage adjacent to the Karta Wilderness, and the Mabel Creek/Barnes Lake area. ADF&G identified these as some of the few remaining unroaded, unfragmented drainages on the north half of Prince of Wales.

Defer harvest the on west side of Neck Lake to protect significant karst resources, to contribute to achievement of proportionality, and to maintain wildlife dispersal corridor between Lab Bay and CPOW project areas.

Reduce use of clearcut harvest.

Emphasize an uneven-aged management harvest area adjacent to Sarkar Lakes to maintain visual, wildlife, recreation, cultural, subsistence, and fisheries values while still providing for moderate timber production.

Defer timber harvest within the nest and post-fledging area of all known goshawk management areas, and minimize the use use of clearcutting in the foraging areas.

Confine timber harvest to units which average more than 20 MBF per acre.

Select groups of harvest units which are planned to exceed 1.5 MMBF of yarded volume for every mile of new road construction.

Alternative F6

Specific identified areas of importance to subsistence and recreation users and sport hunters were among those deferred from harvest under Alt.F6.

Emphasis. The emphasis of this alternative is to meet the defined purpose and need by configuring planned harvest units throughout the Project Area to respond to site-specific public concern by deferring harvest in specific areas of concern identifed during public response to the Draft EIS, including subsistence testimonies. This approach emphasizes reducing harvest in areas of importance to subsistence users, sport hunters, and recreation users, while seeking to minimize the effects of forest fragmentation and harvest of areas containing karst features. The Alternative F6 map, in the separate map packet, shows the harvest units and associated roads proposed by this alternative in relation to physical and geographic features of the Project Area.

Outputs. Alternative F6 schedules the harvest of 221 individual harvest units, totaling 259 MMBF of sawlog plus utility volume from 9,345 acres. Of this harvest, 17 units totaling 19 MMBF from 861 acres are planned for partial cut; the remainder are planned for clearcut harvest. Also included are approximately 4 MMBF of right-of-way volume associated with new road construction. This alternative requires the construction of 102 miles of new specified roads plus 5 miles of temporary roads. It proposes 74 MMBF scheduled for helicopter yarding and on the remaining units achieves 1.83 MMBF per mile of specified road consruction. Preliminary analysis indicates a net mid-market stumpage value of $0.58 per MBF.

Consequences. Of the 9,345 acres proposed for timber harvest, some is planned within high-use subsistence areas, as identified by the TRUCS (2,929 acres). There is no proposed harvest within high-use subsistence areas identified by public comment/subsistence hearings in relation to CPOW. There are 801 acres of harvest within the ridge-to-ridge definition of Honker Divide, and harvest within the HCA's identified by the VPOP Committee–the Honker Divide HCA (328 acres) and the Staney Creek HCA (870 acres). Harvest is also planned within extended rotation (399 acres) and old-growth habitat (1,813 acres) areas identified by the 1989-94 LTS EIS.

This alternative has the habitat capability to support an estimated 9,945 deer. It would maintain 69,726 acres of old-growth forest in 10,000-acre blocks. Alternative F6 would result in a shift of approximately 18,700 acres from Semiprimitive Non-Motorized to Roaded Modified, based upon the Recreation Opportunity

Spectrum. This alternative would provide an annual average of 572 timber-related jobs over a four-year period.

Guidelines. Guidelines used in selecting units and roads which would be consistent with the emphasis of Alternative F6 include the following:

The baseline used to identify proposed units for this alternative is Alternative A (maximum timber).

Defer timber harvest in all site-specific units identified as concerns as a result of public comment, including subsistence testimony but excluding units with concerns expressed by KPC representatives and ADFG, because those comments were addressed in Alternatives G and H, respectively.

Defer harvest on west side of Neck Lake to protect significant karst resources, to contribute to achievement of proportionality, and to maintain wildlife disperal corridor between Lab Bay and CPOW project areas.

Preferred Alternative

Using an evaluative process that compares the benefits and adverse effects of each alternative against the issues, the USDA Forest Service has identified Alternative F5 as the preferred alternative for this EIS. A final determination will be made by the Ketchikan Area Forest Supervisor in the Record of Decision (ROD).

Comparison of Alternatives

The comparison of alternatives draws together the conclusions from the materials presented throughout the document and provides the results of the analysis in summary form. The following sections provide a comparison of alternatives by: (1) proposed activity, (2) significant issue, and (3) other environmental consequence.

Summary Comparison

Table 2-1 provides a summary of activities, outputs, and environmental consequences by which the alternatives may be compared.

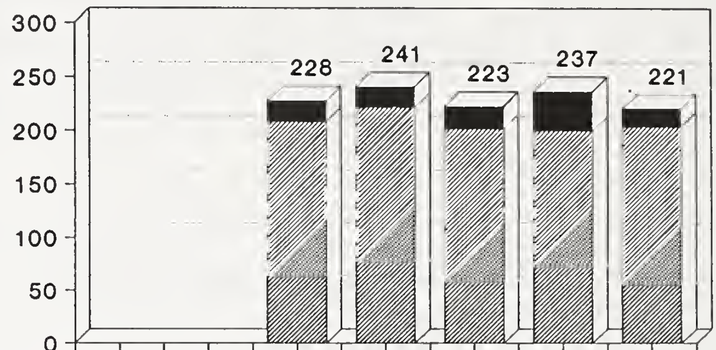
Table 2-1
Summary Comparison of Alternatives

Activity/Resource	Units	Alternatives 1	1a	F2	F3	F4	F5	F6
Units	Number	0	0	228	241	223	237	221
Est. volume (including ROW)	MMBF	0	0	268	264	261	267	263
Clearcut harvest	Acres	0	0	8,397	8,687	8,140	8,257	8,484
Non-clearcut harvest	Acres	0	0	976	832	1,040	1,579	861
Total harvest	Acres	0	0	9,373	9,519	9,180	9,836	9,345
Units >100 but <150 acres	Number	0	0	29	18	24	24	22
Units >150 acres (or adjacency concern)	Number	0	0	5	5	4	8	15
Highlead harvest	MMBF	0	0	67	88	73	72	67
Small skyline harvest	MMBF	0	0	100	134	91	85	84
Slackline harvest	MMBF	0	0	36	38	36	38	34
Helicopter harvest	MMBF	0	0	60	0	57	69	74
Right-of-Way (ROW) harvest	Acres	0	0	4	4	3	3	4
Potential shovel yarding	Acres	0	0	371	617	229	374	262
Est. mid-market stumpage	$/MBF	NA	NA	3.29	2.41	1.03	3.83	0.58
Est. current value stumpage		NA	NA	-10.38	-8.44	-13.13	-4.86	-6.46
Returns to state (based on mid-mark.)	$M	0	0	4,957	5,991	4,644	4,574	4,418
Average annual jobs over 4 years	# jobs	0	0	583	574	570	583	572
Specified road constr.	Miles	0	0	110	135	104	100	102
Temporary road constr.	Miles	0	0	4	11	8	5	5
Road reconstruction	Miles	0	0	78	70	79	78	72
High-use subsistence (TRUCS)	Acres harvested	0	0	2,830	2,726	2,577	2,853	2,929
High-use subsistence (resp. to DEIS)	Acres harvested	0	0	1,655	3,428	1,901	1,519	0
Old growth hab. (1989-94 LTS EIS)	Acres harvested	0	0	1,654	2,718	1,892	1,639	1,813
Honker Divide (ridge-to-ridge)	Acres harvested	0	0	566	1,194	414	436	801
Honker Divide HCA (VPOP Committee)	Acres harvested	0	0	79	1,806	123	129	328
Staney Crk. HCA (VPOP Committee)	Acres harvested	0	0	47	318	422	831	870
1996 MIS - deer	Habitat cap.	10,245	10,280	9,934	9,952	9,942	9,918	9,945
1996 MIS - bear	Habitat cap.	517	517	515	515	515	515	515
1996 MIS - marten	Habitat cap.	499	503	479	476	479	478	480
1996 MIS - river otter	Habitat cap.	168	168	168	168	168	168	168
1996 MIS - hairy woodpecker	Habitat cap.	3,395	3,425	3,181	3,182	3,186	3,172	3,192
1996 MIS - brown creeper	Habitat cap.	5,594	5,673	5,272	5,284	5,279	5,270	5,319
1996 MIS - Van. Canada goose	Habitat cap.	667	670	640	637	640	637	639
1996 MIS - bald eagle	Habitat cap.	375	375	374	375	374	374	374
1996 MIS - gray wolf	Habitat cap.	25	25	24	24	24	24	24
Very high mass movement (MMI 4)	Acres harvested	0	0	0	0	0	0	0
High mass movement (MMI 3)	Acres harvested	0	0	3,548	3,081	3,352	3,879	3,864
Medium mass movement (MMI 2)	Acres harvested	0	0	1,608	1,695	1,726	1,679	1,311
Low mass movement (MMI 1)	Acres harvested	0	0	2,603	2,870	2,625	2,671	2,452
Wetlands harvested/roaded	Acres	0	0	4,436	3,698	4,475	3,706	3,886
Roads crossing Cl.I,II streams	Number	0	0	54	63	47	27	49
Change in ROS: SPNM to RM	Acres	0	0	19,000	15,800	16,000	19,600	18,700
Roadless areas harvested	Acres harvested	0	0	3,584	3,458	3,137	3,664	3,596
Rec. places with some harvest	Number	0	0	14	17	15	14	10
Known karst	Acres harvested	0	0	731	959	958	838	131
Possible karst	Acres harvested	0	0	1,587	1,259	1,583	1,918	1,861
Signif. karst features (KRG survey)	# harv. units	0	0	10	16	15	12	1

Comparison of Alternatives by Proposed Activity

Each action alternative proposes harvest of over 200 individual units. Alternative F5 proposes the most units for partial cut techniques (37), while Alternative 4 proposes the fewest (17). Figure 2-2 shows the number of units proposed for harvest under each alternative, by silvicultural system.

Figure 2-2
Number of Units Proposed for Harvest, by Silvicultural System

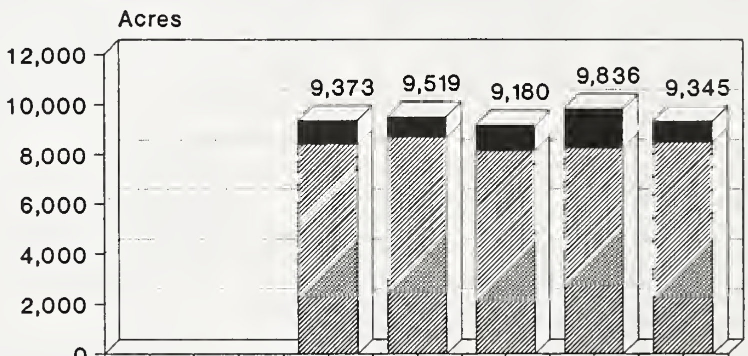


	Altn F1	Altn F1A	Altn F2	Altn F3	Altn F4	Altn F5	Altn F6
Other silv system	0	0	20	19	21	37	17
Clearcut	0	0	208	222	202	200	204

Clearcut ■ Other silv system

Each action alternative proposes over 9,000 acres of timber harvest. Figure 2-3 shows the number of acres proposed for harvest by each alternative by silvicultural system.

Figure 2-3
Total Acres Proposed for Harvest, by Silvicultural System

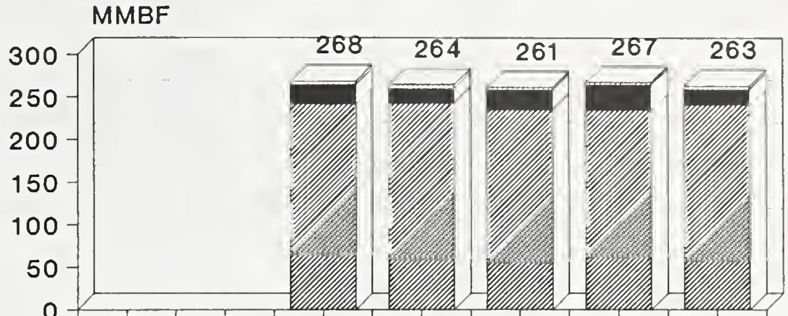


	Altn F1	Altn F1A	Altn F2	Altn F3	Altn F4	Altn F5	Altn F6
Other silv system	0	0	976	832	1,040	1,579	861
Clearcut	0	0	8,397	8,687	8,140	8,257	8,484

Clearcut ■ Other silv system

Each action alternative after consideration of right-of-way volume associated with new road construction approximately meets the purpose and need of 290 MMBF. "Approximately" for this project was interpreted to mean within 10 percent (261-319 MMBF). Alternatives F2 proposes the most harvest at 268 MMBF. Figure 2-4 shows the volume of timber proposed for harvest by each alternative by silvicultural system.

Figure 2-4
Total Volume Proposed for Harvest



	Altn F1	Altn F1A	Altn F2	Altn F3	Altn F4	Altn F5	Altn F6
ROW	0	0	4	4	3	3	4
Other silv system	0	0	23	18	24	30	19
Clearcut	0	0	241	242	234	234	240

Clearcut   Other silv system   ROW

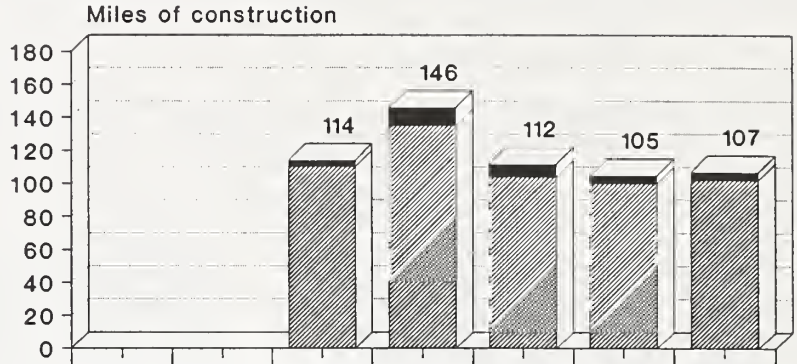
Commercial forest land is divided into Volume Class Strata according to the Ketchikan Area's timber type map. Volume class information is used in numerous analysis processes, including proportionality. Table 2-2 shows the volume class breakdown for each alternative.

Table 2-2
Proposed Harvest by Volume Class Strata

			Acres by Alternative				
Volume Class	1	1a	F2	F3	F4	F5	F6
Unclassified	0	0	459	489	468	473	363
Vol. Cl. 7	0	0	493	456	425	492	227
Vol. Cl. 6	0	0	1,105	1,247	1,220	1,094	1,072
Vol. Cl. 5	0	0	4,090	3,502	3,995	4,345	4,194
Vol. Cl. 4	0	0	3,226	3,825	3,072	3,432	3,489

Road construction is divided into two categories—specified and temporary. Alternative F3 has the most miles of road construction (146 miles) because it proposes no helicopter yarding, while Alternative F5 shows the fewest (105 miles). Figure 2-5 shows the number of miles of new road construction proposed to access the harvest units for each alternative.

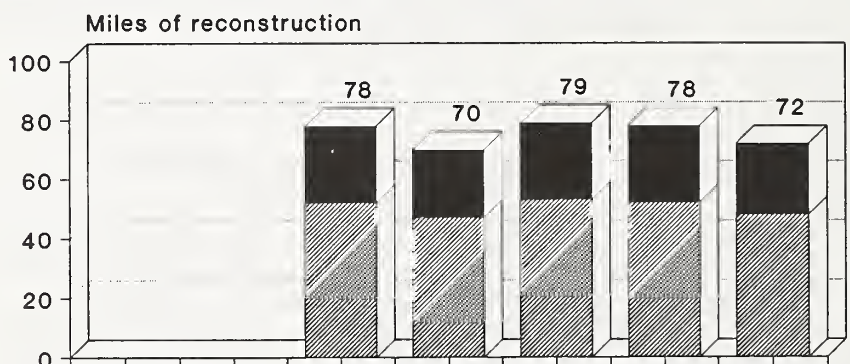
Figure 2-5
Proposed New Road Construction



	Altn F1	Altn F1A	Altn F2	Altn F3	Altn F4	Altn F5	Altn F6
Temporary	0	0	4	11	8	5	5
Specified	0	0	110	135	104	100	102

Road reconstruction is divided into two categories—heavy and light, depending on the intensity of effort and materials necessary to rebuild the road to meet Forest Service standards for log haul. All alternatives propose approximately 70 miles of road reconstruction. Figure 2-6 shows the number of miles of road reconstruction by category proposed to access the harvest units for each alternative.

Figure 2-6
Proposed Road Reconstruction



	Altn F1	Altn F1A	Altn F2	Altn F3	Altn F4	Altn F5	Altn F6
Heavy	0	0	26	23	26	26	24
Light	0	0	52	47	53	52	48

There are four existing communities that are expected to do the bulk of the logging and road construction for the timber released for harvest under CPOW: Thorne Bay, Naukati, Whale Pass, and Coffman Cove. Each of these camps has an existing LTF.

In addition there are existing LTF's at Winter Harbor and Whale Pass. This analysis has roughly estimated which units or groups thereof would most economically be taken to a given LTF. Actual haul may be different. Table 2-3 shows the volume of harvest projected to be hauled to each LTF.

Table 2-3
Proposed Harvest, by Existing Log Transfer Facility, in MMBF

	Alternatives						
	F1	F1a	F2	F3	F4	F5	F6
Whale Pass	0	0	8	18	12	7	3
Coffman Cove	0	0	61	60	46	49	62
Winter Harbor	0	0	1	9	11	18	20
Naukati	0	0	39	40	39	31	24
Thorne Bay	0	0	155	133	151	159	150

Existing Log Transfer Facilities (LTF's) would be used under all CPOW alternatives.

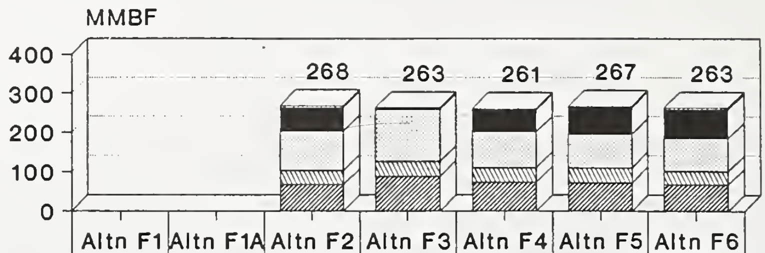
Comparison of Alternatives by Significant Issue

Chapter 1 presents in detail the significant issues that are the focus of this EIS and the key indicators for evaluating the impacts of timber harvest on each issue. This section compares the alternatives in terms of these issues. The baseline for comparing alternatives is Alternative 1, the no-action alternative.

Issue 1: Cost effectiveness of timber harvest operations

Estimated timber economics focuses on the residual value (stumpage) of the timber after all associated logging and transportation costs are subtracted. Generally speaking, the most expensive logging system is helicopter, followed by slackline. Helicopter yarding is necessary in areas where it is impractical to build roads or where aerial logging is necessary to meet specific standards and guidelines. Alternative F6 has the most helicopter volume (74 MMBF), while Alternative F3 has none at all. Figure 2-7 compares the logging systems proposed for each alternative.

Figure 2-7
Timber Harvest by Logging System

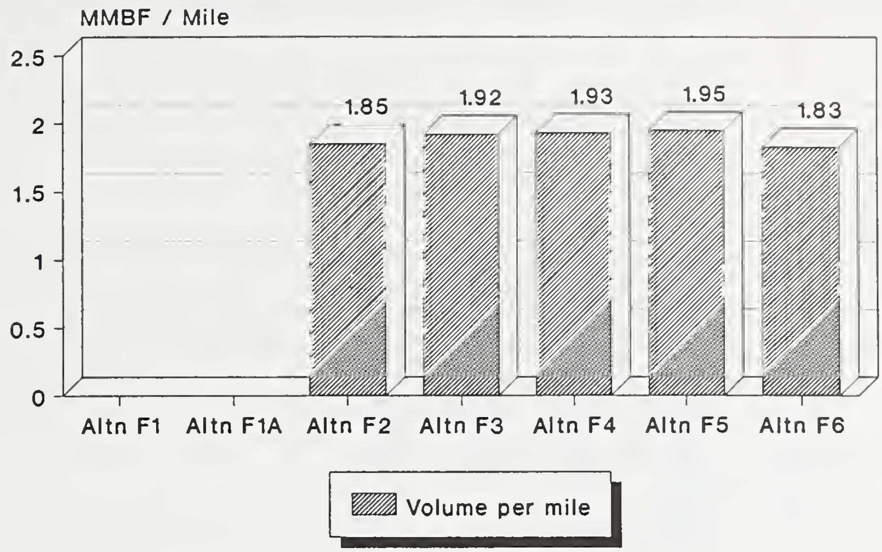


	Altn F1	Altn F1A	Altn F2	Altn F3	Altn F4	Altn F5	Altn F6
ROW	0	0	4	4	3	3	4
Helicopter	0	0	61	0	57	69	74
Small skyline	0	0	100	133	91	85	84
Slackline	0	0	36	38	36	38	34
Highlead	0	0	67	88	74	72	67

Highlead · Slackline · Small skyline · Helicopter · ROW

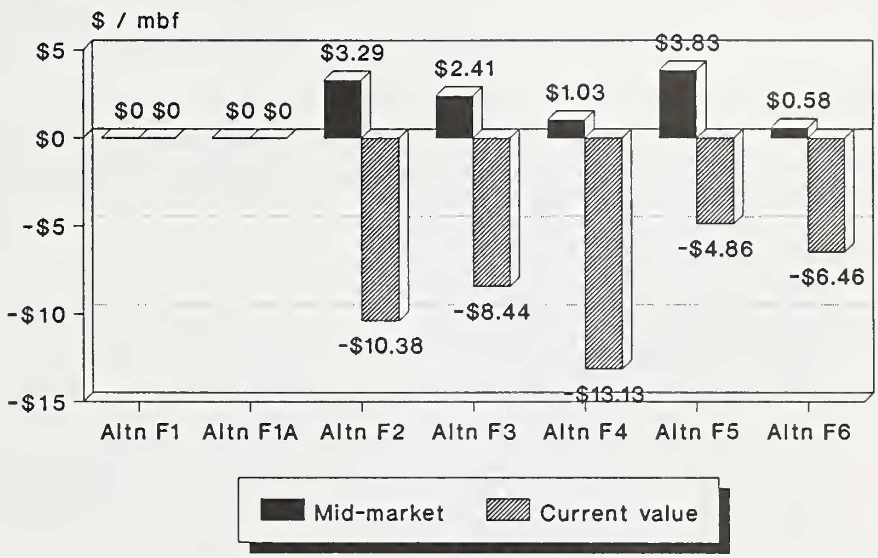
Another indicator of timber economics is the amount of non-helicopter volume which can be harvested per mile of new specified road construction (helicopter volume is excluded because it generally does not have associated new road construction). All alternatives are virtually the same, with Alternative F5 having the best timber recovery in terms of MMBF per mile of new road construction (1.95 MMBF). Figure 2-8 shows timber recovery by alternative, as expressed by cable yarded volume per mile of new specified road construction.

Figure 2-8
Cable Yarded Volume Per Mile of New Road Construction



Based on the analysis of timber values in the Timber section of Chapter 3, all alternatives show a positive net stumpage, based upon mid-market conditions. Alternative F5 has the highest value ($3.83), while Alternative F6 has the lowest ($0.58). All alternatives show a negative net stumpage, based upon current market conditions, i.e., effective April 1, 1993. Alternative F5 has the least negative value (-$4.86), while Alternative F4 has the most negative value (-$13.13). Actual stumpage rates will be determined from existing selling values and logging costs in effect at time of appraisal. It is noted that timber prices are on an upward trend, and it is expected that the first CPOW timber offerings will appraise positively at full profit and risk. Figure 2-9 shows mid-market and current value timber stumpage by alternative.

Figure 2-9
Estimated Stumpage Values

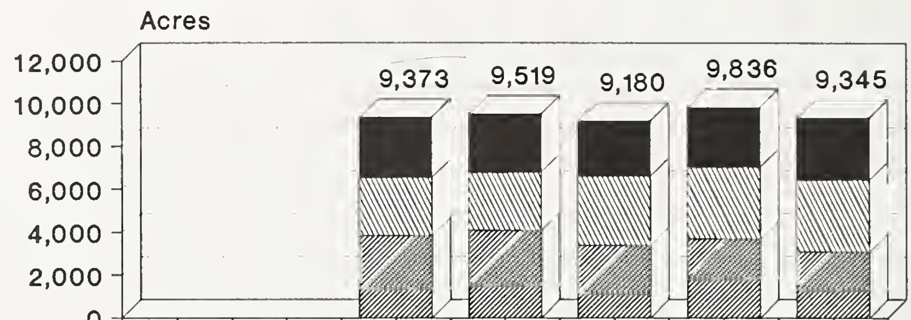


Issue 2. Impact of Timber Harvest Operations on Subsistence Use

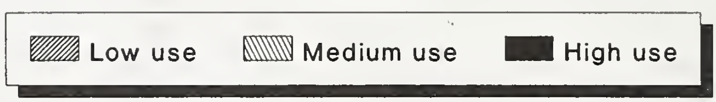
Chapter 3 evaluates the potential site-specific effects on subsistence that could result from implementing any of the proposed timber harvest and associated road construction alternatives. Based on potential direct and cumulative effects of timber harvest, there may be a significant possibility of a significant restriction of subsistence use of deer within the Project Area under all alternatives, including the no-action alternatives. The proposed alternatives do not present a similar possibility of significantly restricting other subsistence uses.

Within Chapter 2, effects on subsistence use will be measured by the acres harvested of currently highly used subsistence areas, as well as by the short- and long-term effects of timber harvest on deer populations. The TRUCS identified areas which are most heavily used by subsistence households. Based on the TRUCS, Alternative F4 harvests the fewest acres of high-use subsistence areas (2,577), while Alternative F6 harvests the most (2,929). Figure 2-10 compares the harvest acres for each alternative in terms of importance to current subsistence use patterns, as identified by TRUCS.

Figure 2-10
Subsistence Use of Harvest Units, Based on TRUCS

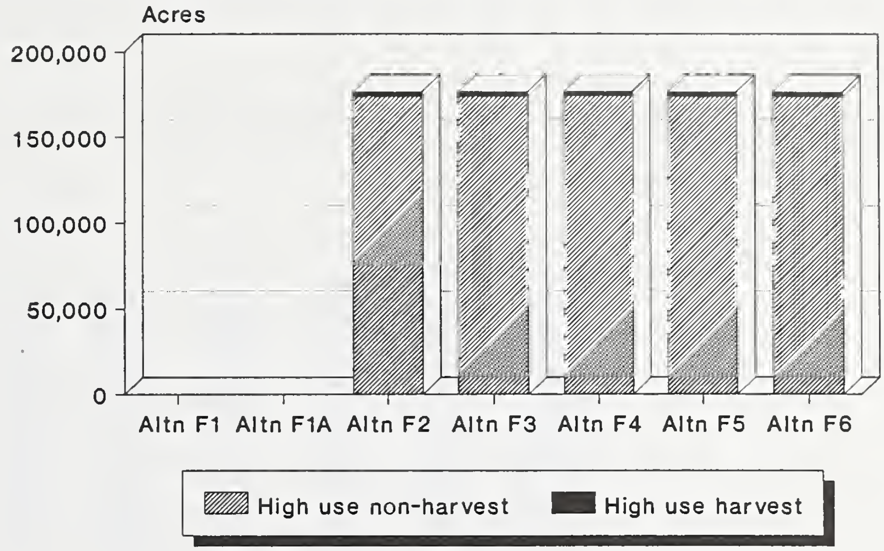


	Altn F1	Altn F1A	Altn F2	Altn F3	Altn F4	Altn F5	Altn F6
High use	0	0	2,830	2,726	2,577	2,800	2,929
Medium use	0	0	2,718	2,717	3,223	3,340	3,314
Low use	0	0	3,825	4,076	3,380	3,696	3,102



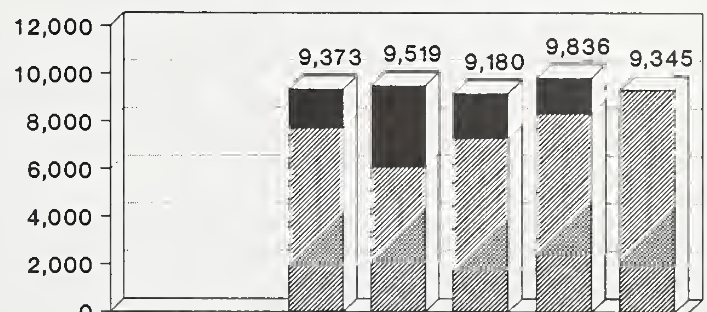
TRUCS identified 176,360 acres of high subsistence use areas. All the action alternatives propose harvest in less than 2 percent of these areas. Figure 2-11 shows the proportion of high-use subsistence areas identified by TRUCS that is proposed for harvest by each alternative.

Figure 2-11
TRUCS High Use Subsistence Areas Harvested



Subsistence hearings and public comment on the CPOW Draft EIS provided site-specific comments that identified which proposed harvest units are currently heavily used by subsistence households. These areas are different from those identified by the TRUCS but are likely to have considerable overlap. Based on the public comment/subsistence hearings, Alternative F6 proposes the least harvest in these areas (0 acres), while Alternative F3 proposes the most harvest (3,428 acres), as shown in Figure 2-12.

Figure 2-12
Public Comment Subsistence Areas Harvested

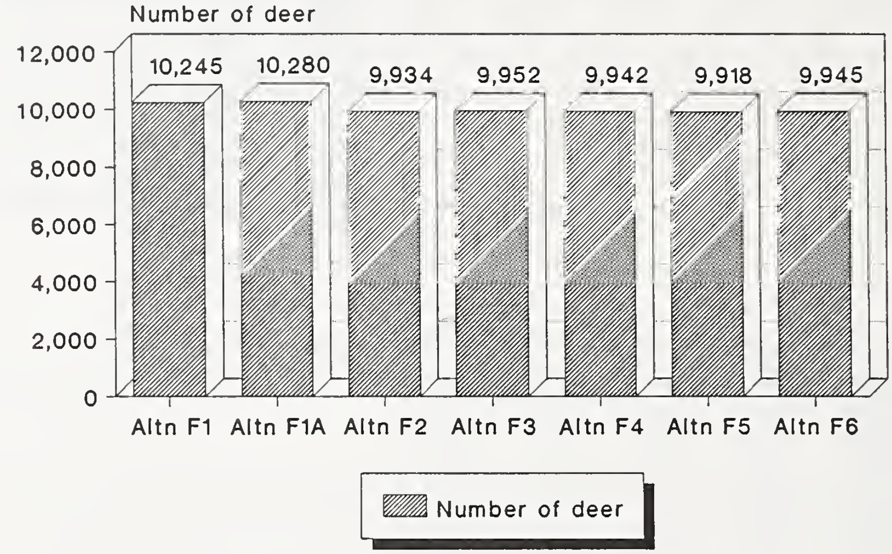


	Altn F1	Altn F1A	Altn F2	Altn F3	Altn F4	Altn F5	Altn F6
High use subsistence	0	0	1,655	3,428	1,901	1,519	0
Other areas	0	0	7,718	6,091	7,279	8,317	9,345

Other areas High use subsistence

Deer hunting is one of the most important aspects of subsistence use (in terms of edible pounds consumed) affected by timber harvest. The Wildlife and Subsistence sections of Chapter 3 discuss the computer models used to estimate the effects of timber harvest on deer habitat capability—both long range and short range. Based on this analysis, Alternatives 1 and 1a would cause no reduction of deer habitat capabilities. Among the action alternatives, Alternative F3 would cause the least reduction to deer habitat capabilities (-293), while Alternative F5 would reduce deer habitat capabilities the most severely (-327). Figure 2-13 shows the estimated short-term (1996) deer habitat capability for each alternative.

Figure 2-13
Estimated 1996 Deer Habitat Capability Remaining After Timber Harvest



Issue 3. Impact of timber harvest operations on wildlife habitat

Chapter 3 contains the detailed evaluation of the potential effects of timber harvest activities on wildlife habitat and wildlife habitat capability.

Old-Growth Habitat. The major effect on wildlife habitats in all action alternatives is the loss of old-growth forest habitat. Impacts to other habitats were greatly reduced by the interdisciplinary design of units prior to alternative formulation. All alternatives result in impacts consistent with the implementation of TLMP and the TLMP Draft Revision, Alt.P.

Table 2-4 shows the potential reduction in wildlife habitat capabilities, as estimated by habitat capability models, for the key Management Indicator Species (MIS) found in the CPOW Project Area. This table displays the 1954 long-term habitat capability and estimated short-term reduction in habitat capability after potential implementation of the alternatives.

Table 2-4
Potential Changes in Habitat Capability for MIS in 1996

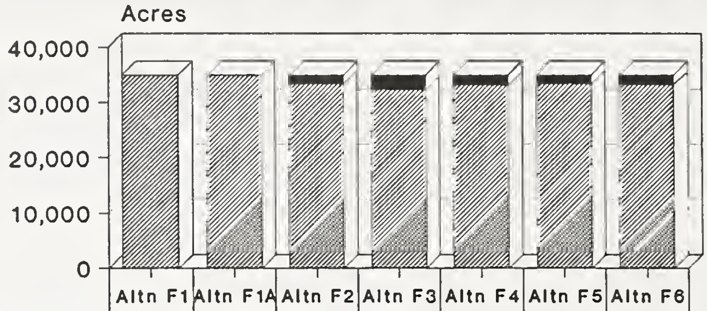
Species	Habitat Capability 1954	Habitat Capability 1993	Changes from 1993 by Alternative 1	1a	F2	F3	F4	F5	F6
Sitka b-t deer	14,942	10,245	0	+35	-311	-293	-303	-327	-300
Black bear	552	517	0	0	- 2	- 2	- 2	- 2	- 2
Otter	192	168	0	0	0	0	0	0	0
Marten	671	499	0	+ 4	- 20	- 23	- 20	- 21	- 19
Hairy woodpecker	7,725	3,395	0	+30	-214	-213	-209	-223	-203
Brown creeper	17,725	5,594	0	+79	-322	-310	-315	-324	-275
Van.Can.goose	902	667	0	+ 3	- 27	- 30	- 27	- 30	- 28
Bald eagle	518	336	0	0	- 1	0	- 1	- 1	- 1
Gray wolf	33	25	0	0	- 1	- 1	- 1	- 1	- 1

The 1989-94 LTS EIS established areas that, for the duration of that project, were to be managed to provide old-growth habitat conditions. These areas were commonly termed "old-growth retention" and were in compliance with the 1986 amendment to TLMP. Within the CPOW Project Area, the 1989-94 LTS EIS designated 35,034 acres to be managed to provide old-growth habitat conditions. The TLMP Draft Revision proposes areas which provide old-growth habitat (beach fringe, Primitive Recreation, and estuarine fringe), which, along with TTRA stream buffers and legislated wilderness areas, are sufficient to meet old-growth habitat requirements as identified in the existing TLMP. Consequently, the old-growth habitat areas designated by the 1989-94 LTS EIS are being reconsidered for harvest by this project.

"In all cases the amount of old-growth habitat proposed for harvest is less than nine percent of the total 1989-94 old-growth habitat within the Project Area.... In all cases, the amount of remaining old-growth habitat meets or exceeds the allocation specified in the existing Forest Plan."

Figure 2-14 shows the relationship of the proposed harvest of old-growth habitat to the amount established for the 1989-94 planning period. In all cases the amount of old-growth habitat proposed for harvest is less than nine percent of the total 1989-94 old-growth habitat within the Project Area. The actual acres harvested range from a low of 1,639 acres proposed in Alternative F5 to a high of 2,718 acres proposed in Alternative F3. In all cases, the amount of remaining old-growth habitat meets or exceeds the allocation specified in the existing Forest Plan.

Figure 2-14
1989-94 Old-Growth Harvested Compared to Total 89-94 Old-Growth

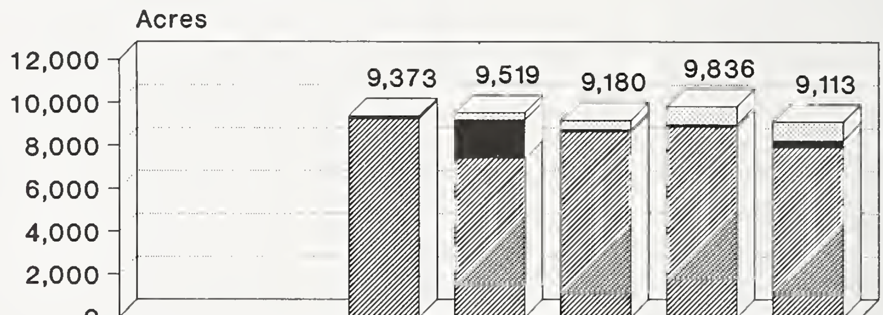


	Altn F1	Altn F1A	Altn F2	Altn F3	Altn F4	Altn F5	Altn F6
OG habitat harvested	0	0	1,654	2,718	1,892	1,639	1,813
OG habitat unharvest	35,034	35,034	33,380	32,316	33,142	33,395	33,221

OG habitat unharvest   OG habitat harvested

The Interagency Viable Populations (VPOP) Committee identified two large blocks of old-growth forest in the Project Area, which they recommended as Habitat Conservation Areas (HCA's). The larger of these HCA's is in Honker Divide (90,000 acres, of which 34,000 acres are within the Project Area), while the Staney Creek HCA totals 23,000 acres, all of which are in the Project Area. Figure 2-15 shows the amount of harvest within each HCA by alternative.

Figure 2-15
Timber Harvest in HCA's



	Altn F1	Altn F1A	Altn F2	Altn F3	Altn F4	Altn F5	Altn F6
Staney HCA			47	318	422	831	870
Honker HCA	0	0	79	1,806	123	129	328
Other harvest	0	0	9,247	7,395	8,635	8,876	7,915

Other harvest   Honker HCA   Staney HCA

Forest fragmentation. Forest fragmentation refers here to a change in the overall forest landscape from large, contiguous blocks of old-growth forest, to smaller blocks separated by timber harvest units. Increased amounts of forest fragmentation indicate reduced habitat potential for species which are thought to be dependent on interior old-growth forest habitat. One way to analyze forest fragmentation is to measure the reduction of large, contiguous blocks of old-growth forest (greater than Volume Class 4)—defined for this analysis as those over 10,000 acres in size—as a result of timber harvest. The existing condition is displayed in Alternatives 1 and 1a, which show there is a total of 74,061 acres of old-growth forest habitat greater than Volume Class 4 in blocks over 10,000 acres in size. Table 2-5 shows the remaining old-growth forest blocks greater than 10,000 acres in size after the proposed timber harvests of each alternative.

Table 2-5
Effect of Timber Harvest on Forest Fragmentation, in Acres

	Alternatives							
	1954	1	1a	F2	F3	F4	F5	F6
Acres of lg. blocks >10,000 acres left after harvest	196,321	74,061	74,061	70,217	69,365	70,148	70,620	69,726

For details see Chapter 3-Old Growth/Biodiversity.

Issue 4. Impact of timber harvest operations on Honker Divide

Honker Divide has several commonly accepted definitions. The most expansive definition includes all lands drained by the Thorne River and Hatchery Creek watersheds from Barnes Lake to Thorne Bay. Based on this definition, Honker Divide has approximately 86,651 acres, of which 38,350 acres are within the CPOW Project Area. (The remainder of Honker Divide will be in the Control Lake project.) Figure 2-16 shows the acres within this definition of Honker Divide that are proposed for harvest by the various alternatives. Alternative F4 proposes the least timber harvest within Honker Divide (414 acres), while Alternative F3 proposes the most harvest (1,194 acres).

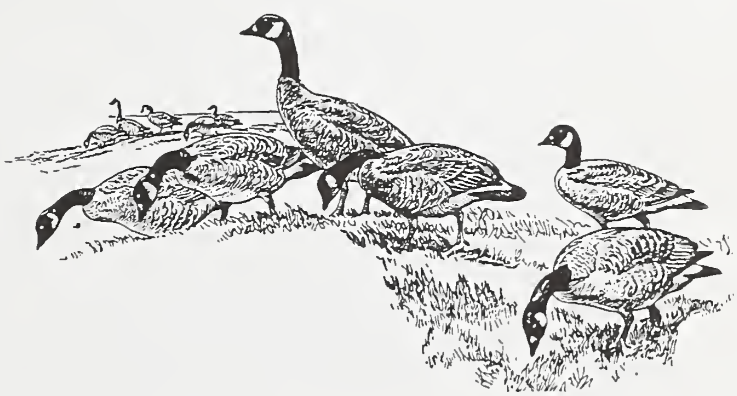
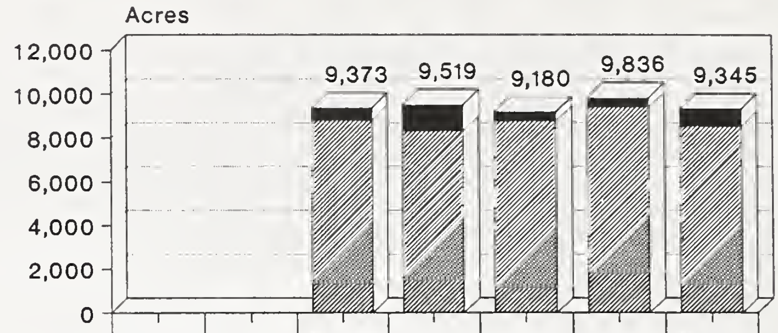


Figure 2-16
Timber Harvest in Honker Divide, Using Ridge-to-Ridge Boundary, Compared to Other Areas



	Altn F1	Altn F1A	Altn F2	Altn F3	Altn F4	Altn F5	Altn F6
Honker Divide	0	0	566	1,194	414	436	801
Outside Honker	0	0	8,807	8,325	8,766	9,400	8,544

Outside Honker ■ Honker Divide

Another definition of the Honker Divide area is the proposed Scenic/Recreational River corridor in the Thorne/Hatchery system that is currently under consideration by the TLMP Draft Revision. There are approximately 26,000 acres within the proposed corridor, of which 6,779 acres are within the CPOW Project Area. The CPOW project has deferred harvest within this area.

Issue 5. Impact of Timber Harvest Operations on Fish Habitat and Water Quality

Fish habitat capability models are used to estimate the effects of timber harvest on the capability of streams to provide habitat for selected species of salmon and trout. Because there are many factors which influence fish populations—including commercial/sport harvest, oceanic conditions, and predation—these computer models provide only relative measures of habitat capability. These models indicate that there is no change in habitat capabilities for coho and pink salmon, or for Dolly Varden char, among the alternatives, including the no-action alternatives.

There is no measurable effect on water quality or fisheries production by any of the timber harvest or associated activities proposed by any of the action alternatives. All alternatives equally apply Best Management Practices (BMP) and TTRA requirements for protection of stream courses and adjacent Aquatic Habitat Management Unit (AMHU) prescription areas.

Every watershed within the Project Area has experienced prior roading and road construction. Re-entering these drainages may generate a greater potential for impacts on water quality, with the adverse effects expected to be greater in those watersheds with the higher cumulative percents of harvest. The standards and guidelines associated with Alternative P of the TLMP Draft Revision (1991a) limit the amount of timber harvest within a given watershed to 35 percent of the total land base within a 15-year period. All CPOW alternatives meet this standard and guideline. Table 2-6 shows past and proposed timber harvest by watershed. This analysis represents a refinement from the Draft EIS, where cumulative watershed harvest was computed on a VCU basis.

Table 2-6
CPOW Watershed Harvest Analysis, by Alternative*

Watershed Order	Watershed Number	Percent Harvest by Alternative Since 1981	F2	F3	F4	F5	F6
3	A55A	30	30	30	30	30	30
3	B19A	0	0	0	0	0	0
3	B25C	1	1	1	1	10	1
3	B27A	0	0	0	0	0	0
3	B28A	0	0	0	0	2	2
3	B38A	0	0	0	0	0	0
3	B43A	0	0	0	0	20	10
3	B46C	19	19	19	19	20	20
3	B53A	8	8	8	8	15	9
3	B55C	12	12	12	12	17	16
3	B62A	12	12	12	12	12	12
3	B63A	25	25	25	25	25	25
3	B66A	6	6	6	6	23	22
3	B67A	21	21	21	21	21	21
3	B68A	16	16	16	16	16	16
3	C22B	17	17	17	17	17	18
3	C23A	16	16	16	16	21	23
3	C26C	5	5	5	5	6	6
3	C27B	5	5	5	5	7	7
3	C29A	0	0	0	0	0	1
3	C34A	0	0	0	0	10	10
3	C36A	0	0	0	0	3	3
3	C37A	0	0	0	0	1	2
3	C40A	8	8	8	8	8	8
3	C44A	0	0	0	0	5	7
3	C53A	0	0	0	0	0	0
3	C56A	0	0	0	0	0	0
3	C63A	0	0	0	0	0	0
3	C70A	12	12	12	12	18	19
3	C72A	0	0	0	0	0	0

continued

Table 2-6 continued

Watershed Order	Watershed Number	Percent Harvest by Alternative Since 1981	F2	F3	F4	F5	F6
4	A54A	4	4	4	4	4	4
4	B21A	0	0	0	0	4	3
4	B25C	0	0	0	0	4	0
4	B43A	3	3	3	3	8	5
4	B45B	0	0	0	0	1	0
4	B54A	22	22	22	22	25	26
4	B56A	9	9	9	9	9	13
4	B61A	15	15	15	15	15	19
4	B65A	17	17	17	17	17	17
4	C20D	3	3	3	3	3	3
4	C32C	1	1	1	1	8	8
4	C39A	0	0	0	0	4	2
4	C45D	5	5	5	5	7	6
4	C46D	0	0	0	0	0	0
4	C49B	0	0	0	0	10	13
4	C67A	13	13	13	13	13	13
4	C74B	0	0	0	0	0	0
4	C96A	6	6	6	6	8	8
4	D01B	19	19	19	19	20	21
4	D02C	3	3	3	3	3	3
4	D03B	3	3	3	3	3	3
4	D08A	0	0	0	0	0	0
4	D12A	2	2	2	2	2	2
5	B24B	3	3	3	3	4	4
5	B47D	0	0	0	0	0	0
5	B57A	14	14	14	14	16	16
5	B59C	4	4	4	4	9	9
5	C21C	13	13	13	13	14	15
5	C48C	2	2	2	2	2	2
5	C49B	7	7	7	7	10	11
5	C95B	23	23	23	23	23	23
6	B44A	0	0	0	0	0	1
6	B58B	7	7	7	7	13	14
6	C32C	11	11	11	11	17	17
6	C99C	8	8	8	8	11	14

* Standards and guidelines allow a 35% harvest of the land base in a given watershed in a 15-year period.

One measure of potential risk to fish habitat from timber harvest is the associated new road construction and road reconstruction which crosses streamcourses (see Chapter 3-Fisheries). During placement of culverts or bridges, sediment may be introduced into the streams which may have short- or long-term effects on water quality. As shown in Tables 2-7 and 2-8, Alternative F4 proposes the fewest stream crossings (118), while Alternatives F3 and F6 propose the most (151). Note that this count of stream crossings includes the recently classified, but as yet umapped streams.

Table 2-7
Stream Crossings to be Constructed

	Alternatvies						
	1	1a	F2	F3	F4	F5	F6
AHMU Class I	0	0	38	29	28	12	27
AHMU Class II	0	0	16	34	19	15	22
AHMU Class III	0	0	90	88	81	104	103
Total	0	0	144	151	118	131	151

Table 2-8
Bridges and Culverts to be Replaced

	Alternatvies						
	1	1a	F2	F3	F4	F5	F6
Permanent	0	0	0	0	0	0	0
Modular	0	0	4	2	2	2	4
Major culvert	0	0	2	2	2	2	2
TOTAL	0	0	6	4	4	4	6

Following timber harvest, there is an increased risk of landslides until second growth and the brush layer become firmly established. One way of analyzing this risk is to determine the amount of timber harvest on slopes which have high mass movement index (MMI) soils. Harvest of these slopes has a relatively small influence on introduction of sedimentation into fish-bearing streams, but does provide a measure of comparison among the alternatives. Table 2-9 shows the proposed harvest on high MMI soils by alternative. See Figure 2-24 later in this chapter for acres of combined harvest and road construction on MMI soils.

Table 2-9
Acres of High MMI Soils Harvested, by Alternative

	Alternatvies						
	1	1a	F2	F3	F4	F5	F6
High MMI soils harvested*	0	0	3,548	3,081	3,352	3,879	3,864

* See Chapter 3-Soils for details of MMI classifications.

The TTRA prohibits commercial timber harvest within a minimum of 100 feet along all Class I streams and those Class II streams that flow directly into Class I streams. In addition, TLMP Draft Revision (1991a) standards and guidelines prohibit harvest along certain Class II and Class III streams, as determined by channel type. Timber harvest, where permitted along these streamcourses, has the potential to cause downstream effects on water quality—including sedimentation, increased water temperature, and oxygen depletion.

AHMU buffers are prescribed to regulate timber harvest and associated road construction activities adjacent to Class I and certain Class II streams. Table 2-10 shows the acres of AHMU buffer affected by road crossings

Table 2-10
Acres of AHMU Buffers Affected by Road Crossings

	Alternatvies						
	1	1a	F2	F3	F4	F5	F6
AHMU Buffer Acres	0	0	50	52	40	41	52

Issue 6. Impact of timber harvest operations on visual quality and recreation

For the purposes of this analysis, 12 viewsheds have been identified as representing the most significant of the viewsheds within the Project Area.

Table 2-11 shows the proposed VQO's for each key viewshed and the percent change in visual disturbance by alternative. In all viewsheds for all alternatives, the proposed harvest unit designs (with recommended mitigation measures) achieve the proposed visual quality objectives.

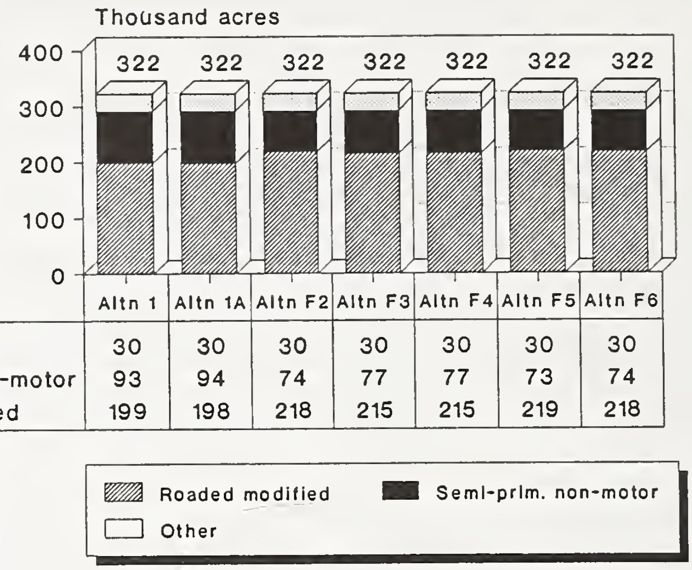
Table 2-11
Proposed CPOW VQO's and Changes Percent Visual Disturbance

Viewshed	Proposed VQO*	Changes in Percent Visual Disturbance by Alternative						
		1	1a	F2	F3	F4	F5	F6
Shaheen Creek	M-MM	0	0	0	1	1	1	1
Staney Creek	R-MM	0	0	3	3	3	3	4
Kussan Point	M-MM	0	0	7	7	11	10	5
Sarkar Cove	PR-MM	0	0	2	3	3	3	0
Sarheen Creek	PR-M	0	0	0	1	1	1	0
Whale Pass	PR-M	0	0	5	5	5	5	3
Barnes Lake	PR-M	0	0	0	1	0	0	0
Sweetwater Lake	PR-M	0	0	0	1	1	0	1
Hatchery Creek	R-PR	0	0	0	1	0	0	1
Baird Peak	M	0	0	5	4	3	5	5
Ratz Harbors	M	0	0	4	0	3	2	4
Sal Creek	M	0	0	5	3	3	4	4

* R = Retention, PR = Partial Retention, M = Modification, MM = Maximum Modification;

Implementing any of the action alternatives will change the existing Recreation Opportunity Spectrum (ROS) class from semi-primitive nonmotorized to roaded modified. Figure 2-17 shows the change in ROS class by alternative.

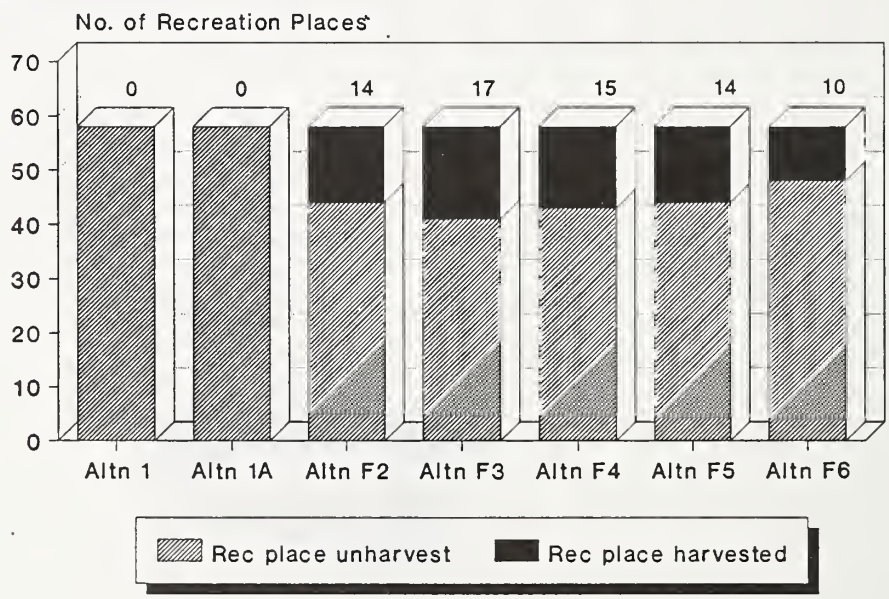
Figure 2-17
Changes in ROS Class, by Alternative



	Altn 1	Altn 1A	Altn F2	Altn F3	Altn F4	Altn F5	Altn F6
Other	30	30	30	30	30	30	30
Semi-prim. non-motor	93	94	74	77	77	73	74
Roaded modified	199	198	218	215	215	219	218

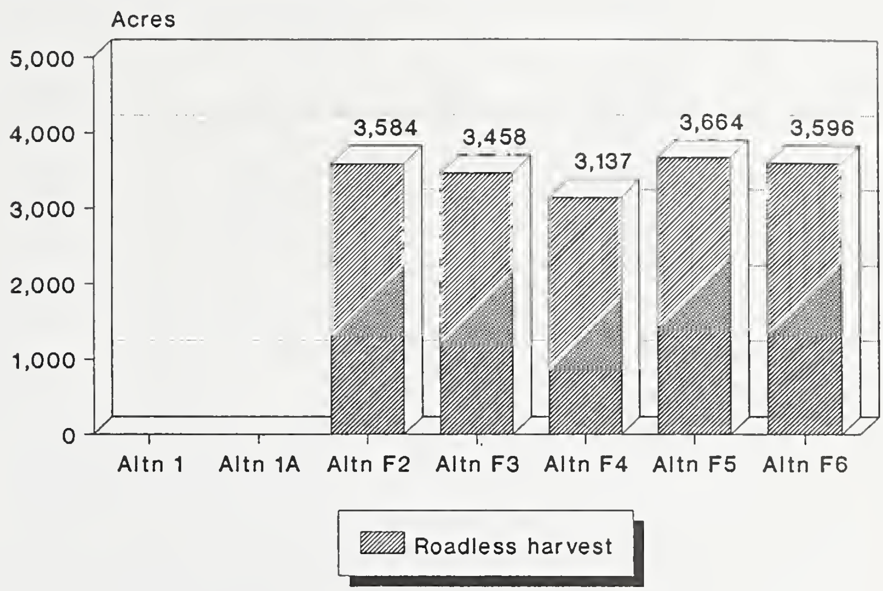
There are 58 inventoried recreation places within the Project Area. Of these, 10–17 will be affected by harvest activities proposed by any of the action alternatives. Figure 2-18 shows the number of recreation places that will be affected by proposed harvest by alternative.

Figure 2-18
Harvest within Recreation Places



The TLMP Draft Revision (1991a) identified several roadless areas which lie within or partially within the Project Area. Of these, 5 have some timber entry proposed by the alternatives. Figure 2-19 shows the number of roadless area acres proposed for harvest by alternative.

Figure 2-19
Timber Harvest within Roadless Areas

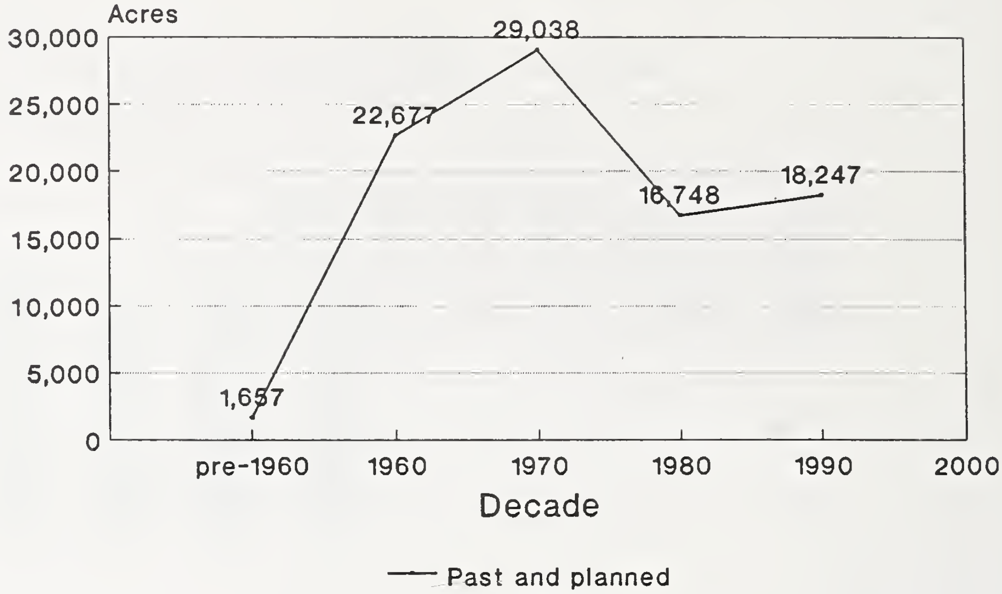


Issue 7. Long-term Stability of Local Communities

There are four communities within the Project Area: Thorne Bay, Coffman Cove, Whale Pass, and Little Naukati. The economic structure of these communities is highly dependent on the harvest of National Forest System timber. One measure of community stability is the short-term timber related employment produced by implementation of the project. Timber jobs are estimated by 1 MMBF producing 8.67 person years of employment. Because all action alternatives propose very close to the same level of timber harvest, the equates to approximately 570 jobs annually, for the period 1993-1996.

Another means of evaluating community stability is to look at past and current timber harvest levels and projected available future timber supply. Because there is minimal difference in harvest levels among the action alternatives, the only comparison shown is between the no-action alternative and the proposed action. Future timber supply is estimated by the timber allocation proposed by Alt. P of the TLMP Draft Revision. Figure 2-20 shows the trends in timber harvest for the overall Project Area. See the Socio-economics section of Chapter 3 for a discussion of the trends for the four timber dependent communities within the Project Area.

Figure 2-20
Average Decadal Harvest for Total CPOW Project Area, Based on Past, Planned, and Projected Future Harvest



Short-term community stability is also dependent on Federal timber receipts. The State of Alaska receives 25 percent of the sum of all net receipts from timber sold on National Forest System land plus any purchaser road credits. This money is earmarked for public school and road maintenance funding. Table 2-12 shows the estimated returns to the State of Alaska from sale of timber from the CPOW Project Area, as proposed by the alternatives. Actual returns will be based upon scaled volumes and appraised rates and may be significantly different from this estimate, which is based on estimated mid-market rates.

Federal timber receipts contribute to short-term community stability by providing dollars for schools and roads.

Table 2-12
Estimated Returns to State of Alaska from Sale of CPOW Timber*

Alternative	Estimated volume (MMBF)	Estimated stumpage ($/MMBF)	Total receipts (M$)	Purchaser Road Credits	State of Alaska returns (M$)
1	0	0	0	0	0
1a	0	0	0	0	0
F2	268	3.29	881	18,948	4,957
F3	264	2.41	636	23,330	5,991
F4	261	1.03	296	18,307	4,644
F5	267	3.83	1,022	17,275	4,574
F6	263	0.58	153	17,521	4,418

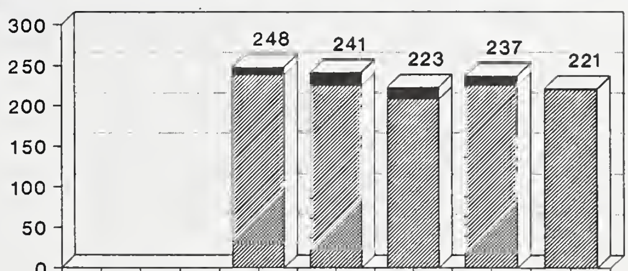
* Based on mid-market rates.

Following completion of the Long-term Contract in 2004, according to the TLMP Draft Revision, Alt. P., there will be sufficient volume remaining in the Project Area to sustain employment at current or historic levels. This indicates that local timber-dependent communities and logging camps within the Project Area can depend on a steady, sustainable timber supply through the end of the first rotation.

Issue 8. Impact of timber harvest operations on karst ecosystem and cave resources.

The Karst Research Group was contracted by the Forest Service to conduct field reconnaissance (recon) on 167 proposed CPOW harvest units to determine if they contained significant karst features. They found significant karst features on about 20 percent of the units surveyed. Their findings were incorporated into the CPOW MELP and resulted in deferring some units from harvest and in redesigning some other units to mitigate the effects of timber harvest. Figure 2-21 shows the number of units each alternative proposes to harvest on areas identified by field survey to contain significant karst features.

Figure 2-21
Number of Units Proposed for Harvest on Significant Karst Features

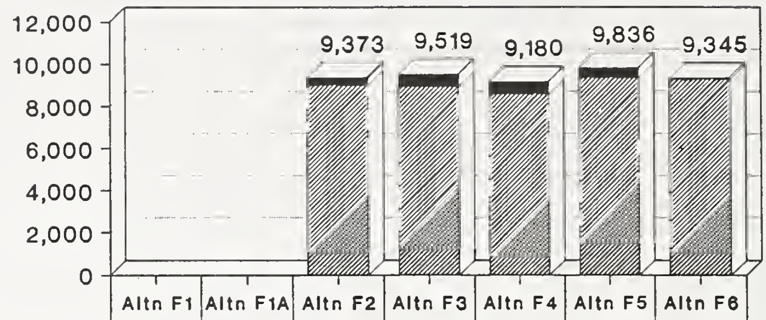


	Altn F1	Altn F1A	Altn F2	Altn F3	Altn F4	Altn F5	Altn F6
Other harvest	0	0	10	16	15	12	1
Signifcant karst	0	0	238	225	208	225	220

Signifcant karst
Other harvest

Figure 2-22 shows the acreage each alternative proposes to harvest from areas identified by field survey to contain significant karst features.

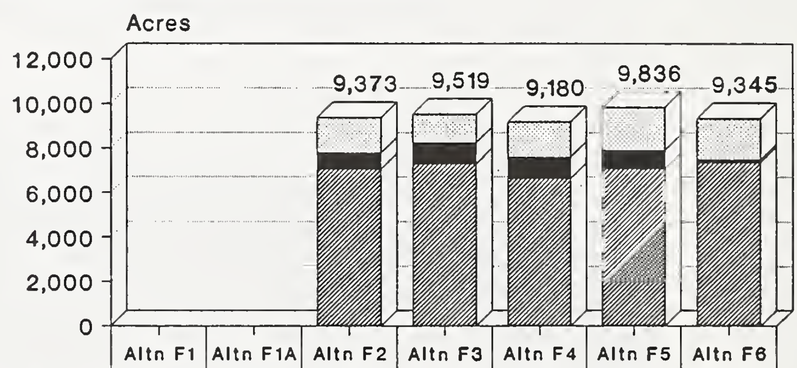
Figure 2-22
Total Acres Proposed for Harvest on Significant Karst Features



	Altn F1	Altn F1A	Altn F2	Altn F3	Altn F4	Altn F5	Altn F6
Significant karst	0	0	392	577	607	490	20
Other harvest	0	0	8,981	8,942	8,573	9,346	9,325
	0	0	392	577	607	490	20

Figure 2-23 shows the acreage of known and potential karst formation proposed to be harvested by each alternative based upon the occurrence of known and possible karst formations as identified from the Ketchikan Area Geologic layer.

Figure 2-23
Proposed Harvest on Karst Ecosystems



	Altn F1	Altn F1A	Altn F2	Altn F3	Altn F4	Altn F5	Altn F6
Possible karst	0	0	1,587	1,259	1,583	1,918	1,861
Known karst	0	0	731	959	958	838	131
Non-karst	0	0	7,055	7,301	6,639	7,080	7,353

Comparison of Alternatives by Environmental Consequences

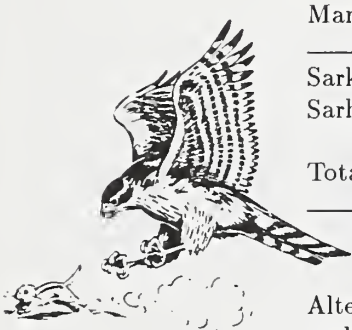
Environmental consequences for subsistence, timber, wildlife, fisheries, watersheds, recreation, and visuals have already been summarized in the preceding section. Disclosure of environmental consequences of other resources is detailed in Chapter 3 and summarized below by resource.

Threatened, Endangered, and Sensitive Species

There are no known threatened or endangered species within the CPOW Project Area. Consequently, none of the alternatives will have any effect on such species. The northern goshawk is listed as a category 2 candidate species. Two goshawk habitat management areas have been located within the Project Area: Sarheen, and Sarkar Lake (near Salt Water Lagoon). The action alternatives propose harvest within these areas, as shown in Table 2-13.

Table 2-13
Harvest within Goshawk Habitat Management Areas, in Acres

	Alternatvies						
Management Area	1	1a	F2	F3	F4	F5	F6
Sarkar Lake	0	0	83	147	147	147	0
Sarheen	0	0	0	270	199	177	119
Total Harvest	0	0	83	417	346	324	119



Alternatives 1, 1a, and F2 will not have any impact on the productivity of the goshawk management area near Sarheen. Alternatives F3, F4, F5 and F6 will harvest approximately 10 percent of the remaining high-volume old-growth habitat (Table 3-8 in Chapter 3-Old Growth and Biodiversity). This harvest when combined with the amount of harvest that has already occurred (1,353 acres), could adversely affect the productivity of this territory.

Alternatives 1 and 1a will not have any impact on the productivity of the Sarkar Lake goshawk management area. The impact that the other alternatives will have is hard to predict since there is very limited information available regarding the effects of timber harvest on goshawk productivity in Southeast Alaska. One way to predict an effect on goshawk productivity would be based on acres harvested. Based on the amount of harvest within goshawk management areas, Alternatives F3 and F4 would be most likely to affect productivity, and Alternative F2 and F6 would have the least impact of the action alternatives. Alternative F5 would cause effects somewhat less than F3 and F4, since 244 acres of the 324 acres of timber harvest are proposed for partial harvest.

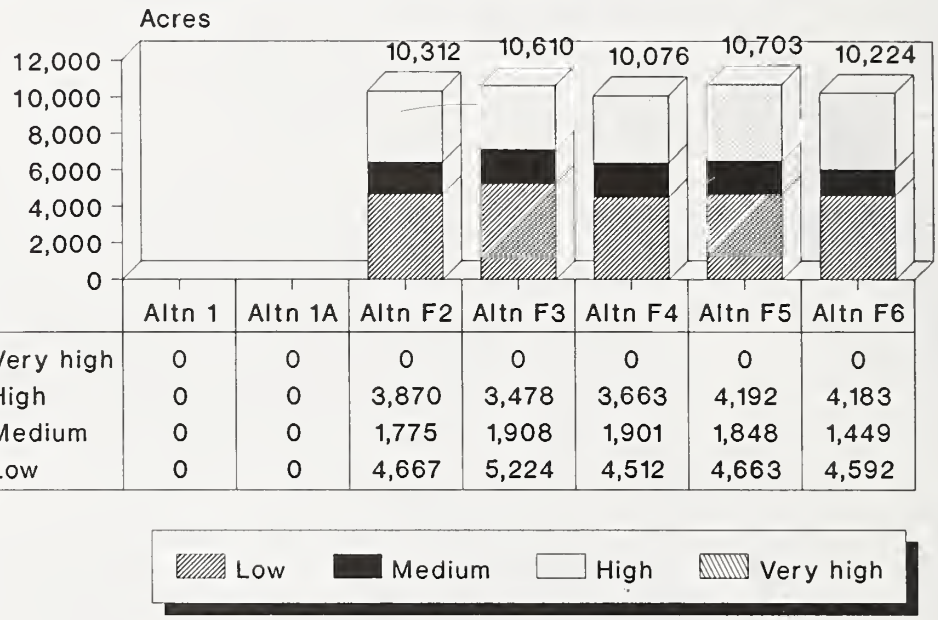
There is a haulout (resting area) for Steller sea lions on the south tip of Grindall Island. No developments are planned within 15 miles of this site.

Soils

The following is a risk assessment of landslide potential as a result of timber harvest and associated road construction. Complying with TLMP Draft Revison standards and guidelines will reduce much of the landslide potential.

Landslides are most likely to occur as a result of timber harvest and associated road construction on landscapes with very high mass movement indices (MMI). There is no proposed CPOW harvest from any areas known to contain very high MMI soils. Landslides typically occur less frequently when these activites occur on areas with high mass movement indices, and, in most cases, are not common on areas with medium or low MMI class. Figure 2-24 shows the number of acres disturbed by timber harvest and road construction by mass movement index. See Chapter 3-Soils for details of MMI categories. See Table 2-9 earlier in this chapter for acres of High MMI soils harvested.

Figure 2-24
Acres of Timber Harvest and Road Construction by Mass Movement Index

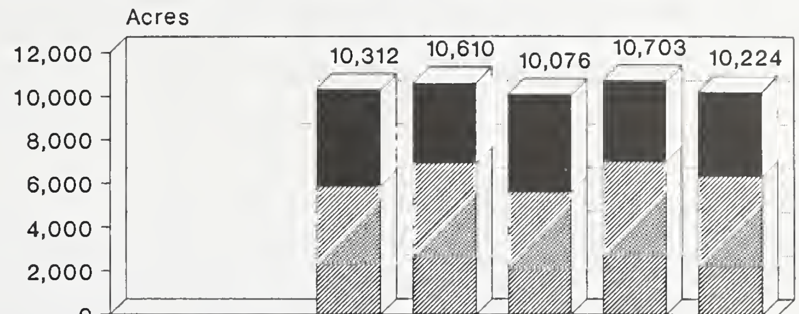


	Altn 1	Altn 1A	Altn F2	Altn F3	Altn F4	Altn F5	Altn F6
Very high	0	0	0	0	0	0	0
High	0	0	3,870	3,478	3,663	4,192	4,183
Medium	0	0	1,775	1,908	1,901	1,848	1,449
Low	0	0	4,667	5,224	4,512	4,663	4,592

Wetlands

Approximately 50 percent (169,962 acres) of the Project Area is classified as wetlands. Executive Order 11990 requires the Forest Service to minimize the long- and short-term adverse effects associated with the destruction or modification of wetlands. Best Management Practices dictate that road construction in wetlands should be avoided where practicable, and that timber harvest within wetlands must be limited to low impact yarding systems. Figure 2-25 shows the number of acres of wetlands with timber harvest and road construction activities.

Figure 2-25
Wetlands With Timber Harvest and Road Construction Activities



	Altn 1	Altn 1A	Altn F2	Altn F3	Altn F4	Altn F5	Altn F6
Wetlands	0	0	4,436	3,698	4,475	3,706	3,886
Non wetlands	0	0	5,876	6,912	5,601	6,997	6,338

Non wetlands Wetlands

Wetlands ▪ forested, non-forested, open

Cultural Resources

Cultural Resource Guidelines define high, medium, and low "sensitivity zones," which are based upon the probability that they may contain significant cultural resources. The Cultural Resources section of Chapter 3 specifies the factors which are used to assign a given area to a particular sensitivity zone. Based upon previous cultural resource surveys, the average site density for the Project Area is approximately one site per 133 acres in the High category, one site per 8,814 acres in the Medium category, and zero sites in the Low category.

All proposed harvest units that included high sensitivity zones were surveyed for cultural resources in FY92. There were several sites identified, all of which were protected through avoidance (timber harvest or road construction was deferred in these areas). The location of these sites, as well as the units in which they were found, cannot be disclosed. This will ensure the sites are undisturbed in compliance with the National Historic Preservation Act and its implementing regulations.

Mitigation Measures

Mitigation measures are site-specific management activites to reduce the adverse impacts of timber harvest and associated ameneities. The Tongass National Forest uses unit cards to display appropriate mitigation measures which will be applied on a site-specific basis, as determined by reconnaissance, Forest Plan standards and guidelines, Best Management Practices (BMP's), and other laws and regulations. Unit cards have been developed for each harvest unit and associated road proposed by the various alternatives, and appear in Appendix G (Vol. II of this EIS).

Information from the unit cards is summarized here and is categorized by resource.

RECREATION

1. After harvest is complete, close new road construction into units 553-221 and 553-222 to reduce motorized vehicular access to adjacent Sarkar Lakes Management Area. This road closure will protect the integrity of the primitive recreation experience. This closure will be fairly successful in reducing car and truck access, but less effective for other types of vehicles.

2. After harvest is complete, close new roads constructed into units 598-203, 598-205, 598-206, 598-207, and 598-249, in the Paul Young Creek area. This closure will inhibit access to the Karta Wilderness Area and remain in effect until the Wilderness Implementation Schedule (WIS) is completed for that area. It should prove a fairly successful measure for cars and trucks, but be less effective for other vehicles.

3. There are 7 units adjacent to the Sarkar Lakes Management Area. A boundary establishment needs to be completed prior to layout. These units and the alternatives under which they are considered are:

Unit	Alternative(s)				
553-222	F2				
571-209	F2		F4	F5	F6
571-210			F4	F5	F6
571-213	F2	F3			F6
571-214	F2	F3	F4	F5	F6
571-252	F2	F3	F4	F5	
588-257	F2	F3	F4	F5	F6

4. Recreation staff will assist in the design and location of roads within recreation places.

5. Unit 574-238, proposed for harvest in Alternative F3, lies partially within the 1/2 mile corridor of the Thorne River. According to the Honker Divide Management Plan adopted by TLMP, 1986, only small harvest units or larger patch cuts are permitted within this 1/2 mile corridor (not to be confused with the 1/4 mile

Wild and Scenic River corridor). Unit 574-238 will be precribed for partial cut harvest.

6. Unit 581-204 B, proposed for harvest in Alternatives F2, F3, F4, F5, lies above Eagle Creek at the outlet of Luck Lake. This is a highly popular fishing spot, known locally as the 'Meathole'. This unit has been redesigned to provide a 300 foot buffer above Eagle Creek and to partial cut the portion of the unit below the road in order to preserve the old-growth appearance of the hiking trail which provides fishing access.

VISUALS

1. In order to meet the visual quality objectives proposed by this project, the following unit is prescribed for partial cut harvest:

Unit	**Alternative(s)**		
583-233	F2	F4	F6

2. There are two adjacent units, 582-214 and 582-215 which are proposed for harvest by Alternatives F2, F3, F5, and F6. As these two units will create a contiguous opening exceeding 100 acres, a 300 to 500 foot leave strip will be provided to keep the created opening under 100 acres. The design of this leave strip will require coordination with a landscape architect during harvest unit layout, in order to meet the VQO proposed by this project.

FISH, WATER QUALITY, AND SOILS

Best Management Practices. Best Management Practices (BMP's) are methods, measures or practices to prevent or reduce water pollution. Their use is required by the TTRA and the Clean Water Act. They include structural and non-structural controls, operation and maintenance procedures, and scheduling and distribution of activities. Usually, BMP's are applied as a combination of practices, rather than a single practice.

An example of a BMP is: Practice 14.6- Timing Restrictions for Construction Activities. Section 4 states "Instream construction activities and the use of equipment within Class I streams will be restricted to the periods when eggs or aelvin are not in the gravels as established in the fish timing window."

Appendix C of the Proposed Revised Forest Plan (USDA Forest Service 1991a) includes a listing of recommended Best Management Practices as identified in the Soil and Water Conservation Handbook (FSH 2509.22).

The effectiveness of BMP's is primarily determined by the degree to which instream water quality meets state water quality standards. Although numerical standards are included in the Alaska state water quality regulations, measurements are difficult to routinely apply to the regulation of nonpoint sediment sources on road construction and timber sale sites. The Environmental Protection Agency has determined that the reasonable implementation, application, and monitoring of BMP's achieves compliance with the intent of the Clean Water Act. Water quality studies conducted in Southeast Alaska indicate that except for short-term localized deviations from numerical standards, "BMP's are effective in maintaining sediment concentrations within state standards" (Paustian 1987).

1. Design stream crossings to provide fish passage for anadromous and resident fishes. This applies to proposed new road construction or major road reconstruction crossing Class I and II streams. (See Appendix G, Unit Cards.)

2. Time road construction activities within all Class I and some Class II streamcourses to protect spawning adult fish and their eggs and fry from disturbance. This means instream road construction activities must be conducted during time periods that would not cause reductions in egg or fry survival or disturb spawning adults. Generally road construction activities adjacent to streams will be restricted to the time period May 15 to August 15.

3. Where possible split yard on all identified streamcourses to maintain streambank stability and prevent stream sedimentation. Recon information has identified areas where it may not be possible to split yard on all identified streamcourses. In these instances, it will be necessary to provide full log suspension over these streams. These units include:

Units	Alternative(s)
550-220	F2 F3 F4 F5
551-250	F3
553-235	F2
571-235	F3 F4 F5
571-267	F2 F3 F4 F5
571-268	F2 F3 F4 F5
583-233	F2 F4 F6

4. Reduce the potential for landslides by providing for full bench road construction and end haul of waste in areas with very high potential for mass movement, as well as in other areas as determined by geotechnical engineers.

5. Another means of reducing the landslide potential is to maintain partial log suspension on all slopes with high mass movement potential. Ground disturbance should not exceed 10 percent. Mitigation may be necessary on units planned for highlead logging and 75 percent or more of the area classified as high mass movement index (MMI) soils. Slopes and soil hazards should be field verified and logging systems redesigned to improve deflection, if warranted.

Unit	Alternative(s)
577-204	F2 F3 F4 F5
577-286	F2 F3 F4 F5 F6
586-201	F2 F3 F4 F5 F6
589-230	F5 F6
589-231	F3 F4 F5 F6
589-263	F3 F4 F5 F6
589-275	F3 F4 F5 F6

6. For National Forest-permitted LTF's, the grade of the working surface shall be constructed to back drain water away from the working face toward filter strips or collection/settling basins. Clean up of bark and debris will occur on a frequent basis in accordance with the neccessary EPA permits.

7. While required TTRA buffers will mitigate most temperature sensitivity concerns, there still is concern about providing topograghic shading to Class III streams that flow through harvest units. Units and groups of units that have

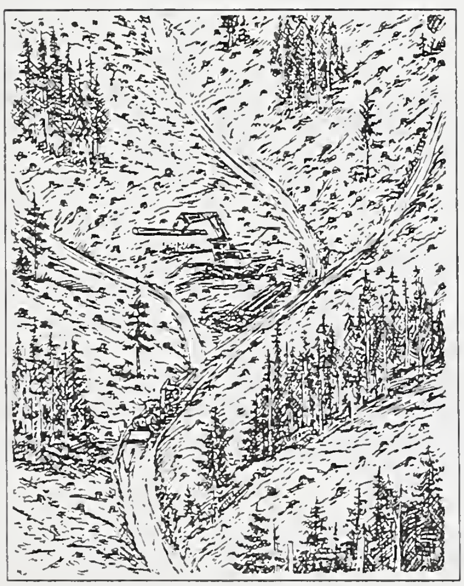
characteristics (south aspect, lack of immediate downstream forested stream buffers, historical and continued harvest activities, etc.) that may contribute to the temperature sensitivity of nearby streams were identified by the IDT. To mitigate this possible effect, all deciduous trees and conifer trees less than 12 inches DBH within 35 feet slope distance of Class III streams, will remain standing in the following units:

Units	Alternative(s)				
571-209	F2		F4	F5	F6
571-210			F4	F5	F6
571-213	F2	F3			F6
571-214	F2	F3	F4	F5	F6
583-233	F2		F4		F6
585-204		F3			F6
585-206	F2	F3	F4	F5	
585-208	F2	F3	F4	F5	
585-210	F2	F3	F4	F5	
585-214	F2	F3	F4	F5	F6
588-212 B	F2	F3	F4	F5	F6
588-213 B	F2	F3	F4	F5	F6
588-324					F6
590-244	F2		F4	F5	F6

8. Implement windfirm, selective harvest buffers on water quality streams in the following units

Unit	Alternative(s)			
580-200	F2,			F6
581-234	F2,	F4,	F5,	F6
588-278	F2,	F4,	F5,	F6

WILDLIFE AND THREATENED & ENDANGERED SPECIES



1. To provide microdiversity within harvested areas, leave windfirm, no-cut timber islands within proposed harvest units greater than 100 acres in size. These islands will vary in size from 1 to 5 acres, with the goal being to have 1 acre of no-cut, windfirm island per 20 acres harvested. The location of these islands will be determined during layout or sale administration, and will be designed in such a fashion as to not impose undue safety hazards on logging contractors. These leave islands are planned for the following units:

Sample distribution of timber islands illustrating how single trees and clumps may be dispersed inside a unit to protect against hazards.

Harvest units	Opening size	Alternatives proposed
551-249,551-250	102	F3
552-201, 552-202	104	F3
571-225,571-257,571-258	111	F6
571-225,571-256,571-257,571-258	150	F2,F3,F4,F5
571-227	111	F2,F3
571-209,571-210,571-213,571-214	130	F6
572-211,572-222	120	F2,F3,F4,F5,F6
573-203,573-274,573-275	107	F2,F3, F6
573-242,573-243,573-244	127	F2
574-210,574-224	105	F2,F3
574-247,574-248	116	F2, .,F4,F5,F6
579-203,579-205	125	F2
579-203,579-205,580-202	143	F5,F6
579-208,579-209	106	F2,F3,F4
579-215,579-216,579-219	119	F3,F4,F5,F6
580-212,580-213	110	F2, F4,F5,F6
580-218,580-219	113	F2, F4,F5
580-227,580-227B,580-230	123	F4,F5
582-214,582-215	117	F2, F5,F6
583-215,583-216	122	F2, F4,F5,F6
583-242,583-243	123	F2, F5,F6
584-250,584-251	104	F2,F3,F4,F5,F6
584-272	132	F2, F4,F5,F6
585-201,585-202,585-203	123	F2,F3,F4,F5
586-226,586-227	121	F3,F4,F5,F6
586-228,586-229	119	F2, F6
586-232,598-242	117	F2, F4,F5,F6
588-212,588-212B,588-213,588-213B	135	F2,F3,F4,F5,F6
588-259,588-260,588-261,588-262,588-263	121	F2,F3,F4,F5
588-269,588-270	130	F2,F3,F4,F5
588-283,588-285	125	F2, F4
588-301,588-302	106	F2
588-304,588-305,588-306	116	F2, F6
588-310,588-312	111	F2,F3,F4,F5,F6
588-322	140	F2,F3,F4,F5,F6
588-327	111	F4,F5
589-203,589-204,589-205	128	F5,F6
590-210,590-211	106	F2, F4,F5
590-229,590-230	107	F2, F4, F6
598-207,598-207B	144	F3,F4

There are other units or clusters of units which were originally greater than 100 acres in size. These other units will incorporate 300- to 500-foot leave strips to reduce opening size to less than 100 acres (see the Timber portion of the mitigation measures below).

2. Provide for habitat requirements of cavity and snag dependent Management Indicator Species (MIS) by leaving 275 snags per 100 acres averaged over each VCU. To provide for adequate distribution of snags within VCU's which have marginal numbers of snags, the following units will have small 0.1-acre (or larger) snag patches distributed throughout the unit at a rate of 0.1 acre per 10 acres of unit. The location of these snag patches will be determined during layout or sale administration, and will be designed in such a fashion as to not impose undue safety hazards on logging contractors.

   Guidelines for placement of snag patches and old-growth islands include:

a. Areas where wildlife use is concentrated (determined during recon).
b. Selected areas should be at least 100 feet away from unit boundary (unless the unit boundary is an existing second-growth stand; then the patch or island can be placed along the unit boundary).
c. Patches or islands can be placed along split yard sections of harvest units, particularly split yard streams.
d. Snag patches or old-growth islands can be incorporated into stream buffers.
e. Snag patches or old-growth islands can be placed along boundaries of muskegs.

Units which will employ these snag recruitment techniques include:

Units	Alternative(s)
579-212	F2 F3 F4 F5 F6
579-213	F2 F3 F4 F5 F6
579-214	F2 F3 F5 F6
579-222	F2 F3 F4 F5 F6
579-223	F4 F5 F6
583-227	F2 F3 F4 F5 F6
585-215	F2 F3 F4 F5
587.1-208	F2 F3 F5
588-327	F2 F3 F5
598-245	F3 F4 F5

3. Region 10 goshawk management guidelines in effect at the time of unit release will be followed. The interim guidelines issued August 18, 1992, call for no harvest within the immediate timber stand (20–30 acres) containing an identified nest tree, limited harvest (five percent per decade) within the adjacent 600 acres (post-fledging area), and mapping out approximately 6,000 acres for the foraging area.

   All known goshawk nests and any new nests discovered during field recon or unit layout will be protected from timber harvest and blowdown by a minimum 660-foot buffer around the nest tree. The following units have been surveyed for goshawk nests and none were found, although alternative nests could exist. The boundaries of these units have been carefully designed so that they avoid encroachment of post-fledging areas. These planned boundaries should be followed.

Units	Alternative(s)
549.2-201	F3 F4 F5 F6
549.2-205	F3 F4 F5
549.2-206	F3 F4 F5
549.2-207	F3 F4 F5 F6
549.2-230	F3 F4 F5 F6
550-208	F3 F4 F5
550-211	F3 F4 F5 F6
550-227	F3
550-228	F3 F4
554.2-210	F2 F3 F4 F5
554.2-220	F3 F4 F5
554.2-225	F3 F4 F5
557-200-B	F2 F3 F4 F5

4. Due to the limited information available on nesting habitat requirements of marbled murrelets, any nests located during field recon or unit layout will be assessed on a case-by-case basis.

5. To protect wildlife habitat or populations from vehicular access, the Access Management Plan, Option B of the 1989-94 LTS EIS, will be implemented. Basically, this plan calls for the closure (by gate, vegetative closure or some type of earth or rock barrier) of all dead-end Local roads or other roads which provide access to important wildlife habitat areas (see Chapter 3-Transportation). The Record of Decision may make changes to the Access Management Plan based on (1) newly identified wildlife habitat management areas, or (2) areas to which the Forest Service must maintain temporary access for silvicultural treatments.

6. Road construction and harvest activities for unit 583-258 will be limited to the time period outside the wolf mating and denning season (normally January 1 through June 30). In addition, the access road to this unit will be closed following completion of post harvest activities.

7. Timber harvest units that are within a half mile of Barnes and Sweetwater lakes and Gold and Galligan Lagoon will have harvest and road construction activities limited to the time period when trumpeter swans are not present (normally from April 1 to October 31). This affects the following units:

Unit	Alternative(s)	
573-273	F3	
573-210	F3	F6
573-225	F3	
573-228	F3	
573-264	F3	F6
573-268	F3	F6
573-289	F3	F6

8. Road construction activities that are within a half mile of bald eagle nests will usually have blasting restricted to the period of September 1 to February 28. If the nest is unoccupied, normal blasting procedures are also permitted from June 1 to August 31 if there is no direct danger to eagles, nests, eagle nest trees, or other eagle habitat elements. Blasting within 1/2 mile of an active eagle nest is only allowed if 1) the blasting can be accomplished in accordance with the requirements of the Bald Eagle Protection Act; 2) written coordination with the U.S. Fish and Wildlife Service has occurred; 3) the results of the interagency coordination is documented. Road construction to the following harvest units may have blasting restricted to certain time periods:

Unit	Alternative(s)				
551-254			F4		
571-274	F2	F3	F4		F6
581-200	F2	F3	F4	F5	F6
581-201	F2	F3	F4	F5	F6
581-204	F2	F3	F4	F5	
581-204 B	F2	F3	F4	F5	
582-211	F2	F3		F5	F6
582-218	F2		F4	F5	F6
583-229	F2	F3	F4	F5	F6
583-233	F2		F4		F6
586-229	F2	F3	F4		F6
587.1-215	F2	F3	F4	F5	F6
589-262	F2	F3	F4		F6

9. The following Forest-wide standards and guidelines have been developed for application on all Forest Service permitted or approved activities and have been incorporated by reference into the CPOW Final EIS from the Supplement DEIS Tongass Land Management Plan:

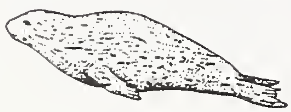
   Provide for the protection and maintenance of whale habitats:
   a. Avoid intentional aircraft flights below 500 feet above ground level in the known vicinity of whales on Forest Service permitted or approved activities, when weather ceilings permit.
   b. Avoid intentional approach in a vessel of 100 feet or more in length to within 1/4 mile of whales on Forest Service permitted or approved activities, when safe passage exists.
   c. Avoid intentional approach in a vessel of less than 100 feet in length to within 100 yards of whales on Forest Service permitted or approved activities, when safe passage exists.

10. Forest-wide standards and guidelines direct the Forest Service to prevent and/or reduce potential harassment of sea lions and other marine mammals due to activities carried out by or under the jurisdiction of the Forest Service, and these have been incorporated by reference into the CPOW Final EIS from the Supplement DEIS Tongass Land Management Plan. These Forest-wide standards and guidelines are as follows:

    Provide for the protection and maintenance of harbor seal, Steller sea lion, and sea otter habitats.
    a. Ensure that Forest Service permitted or approved activities are conducted in a manner consistent with the Marine Mammal Protection Act and the Endangered Species Act. 'Taking' of marine mammals is prohibited; taking includes harassment, pursuit, or attempting any such activity.
    b. Locate facilities and concentrated human activities requiring Forest Service approval as far from known marine mammal haulouts, rookeries and known concentration areas as practicable. The following distances are provided as general guidelines for maintaining habitats and reducing human disturbance:
       * Facilities, camps, LTF's, campgrounds and other developments should be located 1 mile from known haulouts, and farther if the development is large.
       * For aircraft flights on Forest Service approved projects, when weather ceilings permit, maintain a constant flight direction and airspeed and a

minimum flight elevation of 1,000 feet (305 meters) within .5 miles (800 meters) of the haulouts.

* For boat traffic on Forest Service approved projects, remain at least .5 miles (800 meters) away from hauled-out harbor seals during the pupping and rearing season (15 May–1 July). Minimize disturbance of seals with pups in the water by remaining at least 330 feet (100 meters) away from parturient seals. (*Note:* These distances are derived from a study in a park where hunting is prohibited and access is restricted and where viewing seals is encouraged. These distances may be too liberal and may need to be enlarged in situations where access and hunting are not controlled and where seals would be expected to be more reactive to boat traffic.)
* Minimize disturbance effects of boat traffic: for molting harbor seals, remain .5 miles (800 meters) away from haulouts where seals are molting; for Steller sea lions, remain at least .5 miles (800 meters) away from haulouts and rookeries; for sea otters, avoid known feeding and resting concentration areas, especially following prolonged stormy periods when sea otters have been unable to feed.
* Individuals associated with Forest Service permitted or approved activities will not intentionally approach within 100 yards, or otherwise intentionally disturb or displace any hauled-out marine mammal.


Harbor seal

TIMBER

1. It is desirable to maintain the cedar component in stands where it naturally occurs. Because cedar tends to regenerate poorly following clearcut harvest in some stands, it is desirable to not harvest the mature cedar but to retain that vegetative structure for biodiversity and to establish cedar regeneration. Silvicultural methods such as seed tree or shelterwood are appropriate to meet specific resource objectives. Areas identified to be best suited for cedar regeneration include units within the cedar or mixed conifer plant association that are proposed for helicopter yarding and having either elevations over 1,200 feet (on north and east aspects) or over 1,500 feet (on south and west aspects). Specific units identified as meeting this criteria include:

Units	**Alternative(s)**
573-249	F2 F4 F5 F6
573-251	F2 F5 F6
574-239	F6
580-200	F2 F6
584-272	F2 F4 F5 F6
588-283	F2 F4 F5 F6
590-210	F2 F4 F5 F6
590-211	F2 F4 F5 F6
590-219	F2 F4 F5 F6

2. There are several units where site-specific silvicultural prescriptions have identified the need to utilize a seed tree harvest to help regenerate the stand. These units are:

Units	**Alternative(s)**
549.2-205	F3 F4 F5
572-221	F2 F3 F4 F5 F6
585-215	F2 F3 F4 F5

3. Based on preliminary recon there are some units which, because of their elevation, aspect, or indigenous plant association, may have problems establishing adequate natural regeneration. Supplemental hand planting will be done as necessary.

Units	Alternative(s)				
552-215		F3			
554.2-201	F2	F3	F4	F5	F6
573-249	F2		F4	F5	F6
573-251	F2			F5	F6
580-212	F2		F4	F5	F6
581-241					F6
584-226	F2	F3	F4	F5	F6
584-227	F2		F4	F5	F6
584-252	F2	F3	F4	F5	F6
585-210 B	F2	F3	F4	F5	
588-300			F4	F5	F6
588-301	F2				F6
588-305	F2				F6
589-214		F3	F4	F5	F6

4. The TLMP Draft Revision Alt P has identifed a stream and lake land use designation, which prescibes an extended buffer beyond the TTRA buffer for the purpose of preserving riparian habitat. This extended buffer permits timber harvest using uneven-aged management. The MELP analyzed the proposed harvest units which included areas within this stream and lake land use designation. The following units contain riparian areas to be harvested using uneven-aged silvicultural techniques such as group selection.

Units	Alternative(s)				
549.2-201		F3	F4	F5	F6
553-219		F3			
553-228	F2				
554.2-225		F3	F4	F5	
571-252	F2	F3	F4	F5	
573-297		F3			
573-314		F3			
577-284	F2	F3	F4	F5	F6
583-258		F3	F4	F5	
585-201	F2	F3	F4	F5	
585-203	F2	F3	F4	F5	
585-204		F3			F6
585-206	F2	F3	F4	F5	
587.1-209	F2	F3	F4	F5	F6
588-212 B	F2	F3	F4	F5	F6
588-213 B	F2	F3	F4	F5	F6
588-215 B		F3			
590-231	F2		F4	F5	F6

5. There are numerous units or clusters of units which create contiguous openings in excess of 100 acres. These units will incorporate 300- to 500-foot leave strips so that no opening exceeds 100 acres. These leave strips will be designed to achieve reasonably windfirm edges, while maintaining logging feasibility. These leave strips will play an important role in ecosystem management by providing wildlife

corridors, snag recruitment, legacy trees, refugia for vascular plants, and visual diversity.

Units over 150 acres or those with NFMA adjacency concerns (green-up) to which this mitigation measure applies include:

Harvest units	Opening size	Alternatives proposed
571-226,571-227	159	F6
571-226,571-227,571-260	210	F5
571-253	115 (Adjacency)	F2,F3,F4,F5
572-211,572-212,571-221,571-222	206	F6
574-239	128 (Adjacency)	F6
571-209,571-210,571-213,571-214	130	F6
579-215,579-216,579-217,579-218,579-219	193	F5,F6
584-218	120 (Adjacency)	F2,F3,F4,F5,F6
585-201,585-202,585-203,585-204	152	F3
586-216,586-217,586-218,586-218B	128 (Adjacency)	F2,F3,F4,F5,F6
586-225,586-226,586-227,586-228,586-229	292	F6
588-268,588-269,588-270	172	F6
588-283,588-285,588-286,588-287	199	F5,F6
588-300,588-301,588-302	154	F6
588-322,588-324,587.1-206,587.1-208	323	F6
589-230,589-231,589-232,589-233	173	F5,F6
598-220,598-222	267 (Adjacency)	F2,F3,F4, F6
598-220,598-222,598-222B	280 (Adjacency)	F5

CULTURAL RESOURCES

During the summer of 1992, the proposed harvest units were surveyed for existence of cultural resources. Several units were found to contain significant cultural resources to the extent that the most appropriate mitigation measure available was avoidance of harvest. The locations of these units will not be disclosed to preserve the integrity of the sites.

In addition, 13 units were found to either contain or be adjacent to significant cultural resources. Where necessary, boundaries were redesigned to avoid the cultural material. Timber harvest and road location in these 13 units must conform very closely to the planned location. Any deviation must be coordinated with cultural resource personnel. These units include:

Units	Alternative(s)
552-201	F3
553-245	F3
557-200 B	F2 F3 F4 F5
571-252	F2 F3 F4 F5
573-297	F3
573-314	F3
581-204 B	F2 F3 F4 F5
587.1-220	F2 F3 F4 F5
587.1-221	F2 F3 F4 F5
588-324	F6
598-203	F3 F4
598-245	F3 F4 F5

Contracts may be modified by the Forest Service to protect cultural resources which may be discovered during the course of the Purchaser's operations. The KPC Long-Term Contract states that "in the event that any cultural resource is identified, both parties shall be notified immediately. The Purchaser shall protect all cultural resources against destruction, obliteration, removal, or damage during the operating period."

KARST AND CAVE RESOURCES

The standards and guidelines for cave resource management proposed for the TLMP Draft Revision (1991a) have been formulated from field observations. Though the Federal Cave Resources Protection Act charges the Forest Service with protection only of significant caves, the Tongass National Forest is working to protect all significant karst resources. Until resource values are determined, the Ketchikan Area is considering all caves to be significant.

During the summer of 1992, the proposed harvest units were surveyed for existence of significant karst features. Several units were found to contain significant karst resources to the extent that the most appropriate mitigation measure available was avoidance of harvest. The locations of these units will not be disclosed to preserve the integrity of the sites.

In addition, 18 units were found to either contain or be adjacent to significant karst resources. Where necessary, boundaries, logging systems, and road locations were redesigned to avoid these resources. Timber harvest and road location in these 18 units must conform very closely to the planned location. Any deviation must be coordinated with District or Area Cave Resource Specialists. These units include:

Units	Alternative(s)
549.2-207	F3 F4 F5 F6
550-208	F3 F4 F5
550-213	F2 F3 F4 F5
550-215	F2 F3 F4
550-227	F3
550-228	F3 F4
550-239	F2 F3 F4
554.2-220	F3 F4 F5
557-200 B	F2 F3 F4 F5
571-211	F2 F3
571-235	F3 F4 F5
571-256	F2 F3 F4 F5
571-266	F2 F3 F4 F5
571-267	F2 F3 F4 F5
577-214	F2 F3 F4 F5
588-259	F2 F3 F4 F5
588-261	F2 F3 F4 F5
588-327	F4 F5

Specific Mitigation Efforts for Caves

1. If a previously undiscovered site is found during the course of the project, the timber sale administrator will suspend any work that might potentially damage the cave resource. Work may resume after consultation with the local cave management specialist and appropriate line officer.

2. Timber harvest, road construction, and other related management activities in the vicinity of a cave or significant karst feature or above the course of a cave, shall be designed in a way to ensure protection of the cave resources.

3. Surface management activities should be designed so as not to impede or divert surface and groundwater flow into a cave or significant karst feature.

4. Retention of vegetation is required in the vicinity of a cave or significant karst feature to protect the cave's microenvironment. The extent and limits of windfirm no-harvest buffers surrounding significant karst features shall be determined on a case-by-case basis. Topographic breaks and vegetation patterns should be utilized during buffer design and layout.

   In some instances, when a windfirm no-harvest buffer cannot be designed, it may be possible to leave all nonmerchantable timber and ground cover intact, removing the overstory by directionally falling trees away from the significant karst feature. There shall be no ground disturbing activities on slopes steeper than 30 degrees adjacent to cave entrances.

5. Buffers shall be maintained around all direct drainages into significant karst features. This includes dolines; cave collapse areas known to open into a cave's drainage system; and perennial, intermittent or ephemeral streams flowing into caves. The immediate area surrounding resurgence streams shall be protected to ensure stability of the cave ecosystem.

6. Where timber harvest is occurring in the vicinity of a cave, fall trees directionally away from the cave and its course. Yarding should not drag timber across and/or through significant karst features. Trees felled into or across significant karst features shall be not be removed. Any small woody debris that has found its way into significant karst features shall be hand removed within 48 hours.

7. No significant karst feature shall be used as disposal sites for slash, spoils, or other refuse.

8. Design roads and related construction to avoid altering surface drainage into significant karst features or focusing sediment from road surface and/or drainage into significant karst features. Any excavation requiring blasting in the vicinity of a cave should be carefully designed to ensure that seismic shock does not affect the fragile formations in the cave, destabilize cave passages, or alter groundwater flow into the cave. Design quarry and material sources to ensure that location and excavation in no way threaten cave resources.

9. Seasonal closures prohibiting construction activities in some areas may be required to ensure protection of roosting and hibernating bats, nesting birds, or seabird rookeries.

10. Because public use of caves may lead to the degradation of cave resources, protection measures may include maintaining confidentiality about specific site locations, limiting public access as required, and monitoring.

Monitoring

Monitoring activities can be divided into three broad categories: Forest Plan monitoring, routine implementation monitoring, and project-specific monitoring. These broad types are discussed in the following sections.

Forest Plan Monitoring

The national Forest Management Act requires that National Forests monitor and evaluate their forest plans (36 CFR 219.11). The significance of this requirement is emphasized by the recent development of a National Monitoring and Evaluation Strategy (Forest Service 1993). The Strategy is designed to focus agency attention and resources on evaluating implementation of forest plans to provide the Forest Service with information necessary to ensure responsive and efficient management of National Forests. Embodied in the National Monitoring and Evaluation Strategy are three principles:

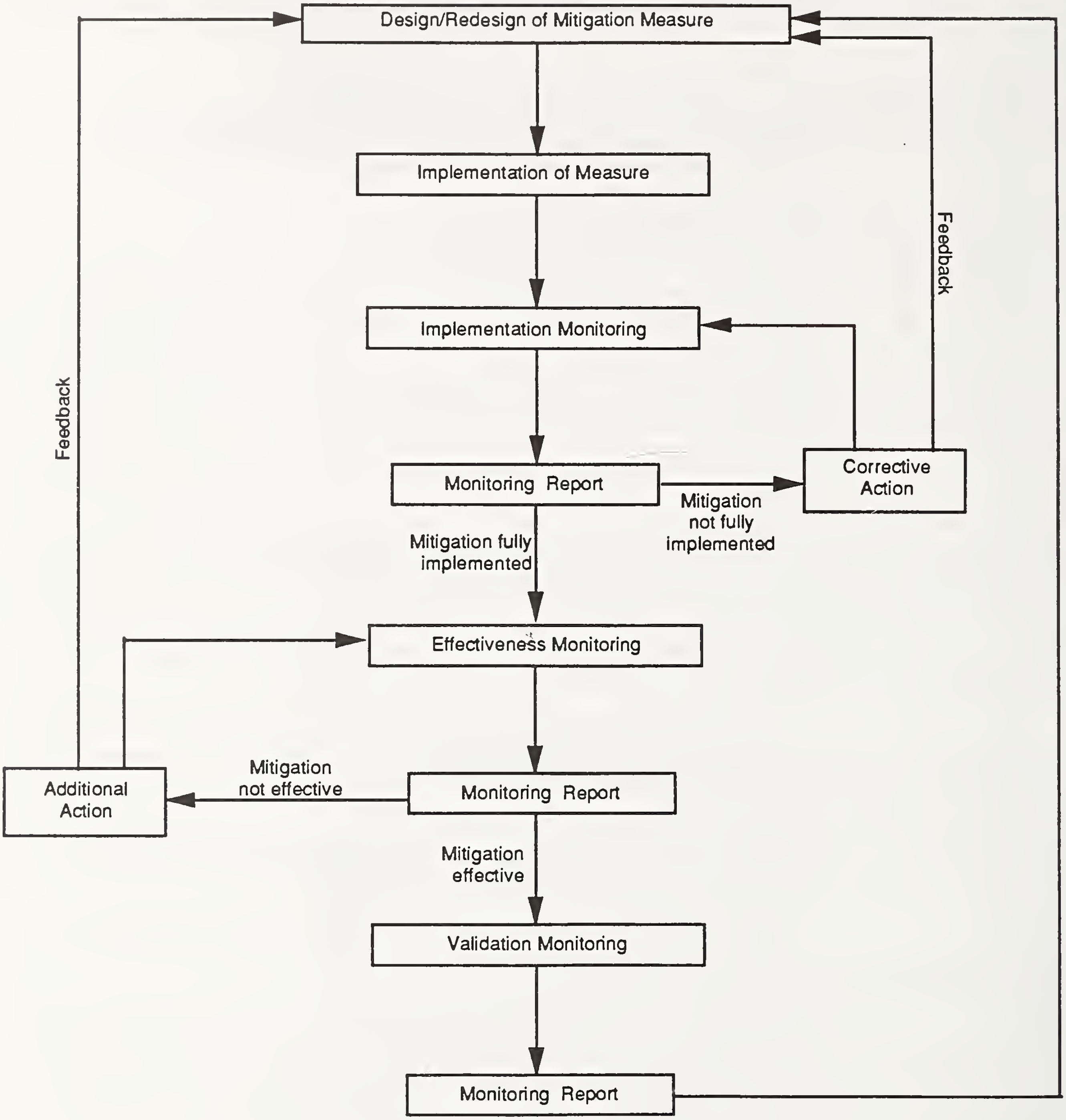
1. evaluation of results will be readily available to the public, agencies, and other groups;
2. monitoring and evaluation will focus on ecosystems and emphasize interrelationships among biotic and abiotic components; and
3. the strategy will be flexible to meet local needs while encompassing forest, regional and national requirements.

Three levels of monitoring are incorporated into Forest Plan monitoring and evaluation.

> *Implementation Monitoring* is used to determine if goals, objectives, standards and guidelines, and management prescriptions are implemented as detailed in the Forest Plan and project specifications;
>
> *Effectiveness Monitoring* is used to determine if goals, objectives, standards and guidelines, and management prescriptions as designed and implemented are effective in meeting Forest Plan goals and objectives; and
>
> *Validation Monitoring* is used to determine whether the data, assumptions, and coefficients used in the development of the Plan are correct.

Most monitoring elements involve the mitigation measures described previously. The mitigation measures are part of a process that includes these three types of monitoring to determine if the measure was implemented and is effective or needs revision. The feedback provided by monitoring results can be used to develop improved methods or additional treatments to ensure that the mitigation will be effective in the future. Figure 2-26 displays how this process of mitigation and monitoring occurs.

Figure 2-26
Mitigation/Monitoring Feedback Loop



An annual monitoring report will be prepared by each Administrative Area of the Tongass and incorporated into one report at the end of each year. This report will address all monitoring questions contained in the applicable Forest Plan; reference all monitoring being conducted on the Area/Forest; assess progress towards achieving the goals and objectives described in the Forest Plan; and either certify that the Forest Plan is sufficient to guide management of the Forest over the next year or propose needed changes and an approach for dealing with those changes.

Forest Plan monitoring is conducted over the entire Forest on a sample basis. Samples may or may not be taken within the CPOW Project Area; however, monitoring results are designed to answer questions regarding the implementation and effectiveness of mitigation within the Project Area. A total of 38 implementation, effectiveness and validation monitoring items are identified in the forest-wide monitoring plan described in the TLMP Draft Revision (1991a).

Routine Implementation Monitoring

Routine implementation monitoring assesses whether the project was implemented as designed and wether or not it complies with the Forest Plan. Planning for routine implementation monitoring began with the preliminary design of harvest units and roads. Specialists used on-the-ground inventories, computer inventories, and aerial photographs to prepare the documents called unit cards for each harvest unit in each of the alternatives. Cards were also prepared for each segment of road. Resource specialists wrote their concerns on the cards and then described how the concerns could be addressed in the design of each unit and road segment. Resource concerns and mitigation measures will be refined further during final layout when specialists will have one more opportunity to revise the unit and road card recommendations. The unit and road cards documents will be the basis for determining whether recommendations were implemented for various aspects of the CPOW Project.

Routine implementation monitoring is part of the administration of a timber sale contract. The sale administrators and road inspectors ensure that the prescriptions contained on the unit and road cards are incorporated into contract documents and then monitor performance relative to contract requirements.

Project-specific Effectiveness Monitoring

In addition to the Forest Plan monitoring and routine implementation monitoring that will be conducted throughout the Tongass National Forest, including the CPOW Project Area, two Project-specific monitoring activities are identified. The following provides a description for each Project-specific effectiveness monitoring activity.

Ecosystem Management
Objective: To determine if the four types of clearcuts, with reserve trees and partial cuts, prescribed in this project for ecosystem management, have been implemented and appear to be effective.
Desired Result: All four types of clearcuts and partial cuts have been implemented and each type appears effective, to varying degrees, at maintaining snag densities and structure in the second-growth stand and at reducing the visual contrast between the clearcut and adjacent old-growth.
Measurement: Compare unit cards and silvicultural prescriptions with observations on the ground on 20 percent of the units. Prepare narrative description and map of reserve tree size, density, and distribution.
Evaluation: Modify future unit prescriptions based on feedback obtained.

Responsible Staff: Craig Ranger District or Supervisor's Office wildlife staff and landscape architect.
Record of Results: Prepare a brief report of results.
Annual Cost: $9,000
Personnel Needs: 0.3 FTE

Trumpeter Swan
Objective: Protect wintering Trumpeter Swans.
Desired Results: Preferred swan wintering areas on Sweetwater Lake, Gold and Galligan Lagoon, and Barnes Lake are protected from disturbance.
Measurement: Visual observation of wintering swans at least once when any timber harvest or road construction occurs within one mile of Sweetwater Lake, Gold and Galligan Lagoon, or Barnes Lake between November 1 and April 1.
Threshold: Evidence that swans are avoiding available habitat because of forest management activities.
Corrective Action: Consult Thorne Bay District Ranger and SO wildlife staff if a conflict arises.
Responsible Staff: TNB RD sale administration employees and wildlife staff.
Record of Results: Sale administrator may record swan observations in daily diary forms. Wildlife specialists will prepare a short memo.
Annual Cost: Ongoing business for sale administrator and wildlife specialist.
FTE Needs: Zero

Goshawk Foraging Areas
Objective: To ensure timber harvest meets intended objective stated for each unit.
Desired Result: Areas prescribed for partial harvest to provide foraging habitat remain windfirm and provide desirable habitat for goshawks and cavity nesting birds.
Measurement: Surveys and observations of birds utilizing the partial harvest areas, plots taken to determine residual basal area of trees remaining; and visual inspection of of buffers strips to check for windfirmness.
Evaluation: Determine if partial harvest units are windfirm and serves as suitable wildlife habitat.
Responsible Staff: TNB RD staff.
Record of Results: Report of finding to the SO.
Annual Cost: Ongoing business; no additional funding needed.
FTE Needs: Zero.

Cave Resources

Prevention of Resource Damage
Objective: To prevent significant or permanent adverse effects to the cave resources as the result of surface management activities and determine if implemented protection measures were effective.
Desired Results: Surface management activities will not have an adverse effect on cave-specific resources, especially on hydrology.
Measurement: Annually conduct field inspections of at least 25% of projects involving surface management activities adjacent to or containing significant features.
Evaluation: Determine if mitigation was successful in avoiding any significant or permanent adverse effects to the cave resources.
Responsible Staff: Forest geologist/ District Cave Resource Management Specialists.
Record of Results: Diaries for sale administrators and memo to Forest Supervisor from the Forest geologist and/or District Cave Resource Management Specialist.
Annual Cost: $10,000
FTE Needs: Zero

Chapter 3
Environment and Effects

Outline

Chapter 3

Affected Environment and Effects of the Alternatives

INTRODUCTION

This chapter presents information about those aspects of the environment that may be affected by timber harvest and roadbuilding activities in the proposed alternatives. The "Affected Environment" portion of each resource section describes the current condition and anticipated trends of the resource, and relevant characteristics that may be subjected to impacts from the alternatives. The "Effects of the Alternatives" portion of each section presents the direct, indirect, and cumulative effects (or impacts) of activities under the alternatives. Thus, this chapter combines into a single chapter information that in many environmental impact statements appears in separate chapters. Chapter 3 provides the basis for the Comparison of the Alternatives section in Chapter 2.

Incomplete or Unavailable Information

There is less than complete knowledge about many of the relationships and conditions of karst hydrology, wildlife, fish, forests, jobs, and communities. The ecology, inventory, and management of a large forest area is a complex and developing science. The biology of wildlife species prompts questions about population dynamics and habitat relationships. The interaction of resource supply, the economy, and communities is the subject matter of an inexact science.

The interdisciplinary team (IDT) examined the data and relationships used to estimate the effects of the alternatives. There is a substantial amount of credible information about the topics of this EIS, and the basic data and the central relationships are well established.

Existing gaps in information are noted in the individual resource sections that follow. When encountering such gaps, in all cases the IDT concluded that the missing

information frequently may have added precision to estimates or better specified a relationship. However, the basic data and central relationships are sufficiently well established in the respective sciences that the new information would be very unlikely to reverse or nullify understood relationships. Thus, new information would have been welcomed and may have added precision, but it was not essential to a reasoned choice among the alternatives as they are constituted.

Analyzing Effects

Effects are quantified (where possible), although qualitative discussions may also be included. The means by which any identified potential adverse effects will be reduced or mitigated are described in detail in Chapter 2.

Environmental consequences are the effects of implementing an alternative on the physical, biological, social, and economic environment. *Direct* environmental effects are defined as those occurring at the same time and place as the initial cause or action. *Indirect* effects are those that occur later in time or are spatially removed from the activity but would be significant in the foreseeable future. *Cumulative* effects result from the incremental effects of actions when added to other past, present, and reasonably foreseeable future actions, regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative effects can result from individually minor but collectively significant actions taking place over a period of time.

For the purposes of this analysis, the reasonably foreseeable time frame over which the indirect and cumulative effects are estimated is until the end of the Ketchikan Pulp Company (KPC) Long-Term Contract (the year 2004). This determination of reasonably foreseeable is based on the time frame of the KPC contract commitment (Appendix A).

The cumulative effects analysis in this document compares future activities expected to occur by the year 2140 (one and a half forest rotations), back to the year 1954 (prior to logging under the KPC contract). The cumulative effects analysis considers the Tongass Land Management Plan (USDA Forest Service 1979a, as amended), and the ten-year timber sale action plan referenced in Appendix A, which is used to project the volume range to be harvested through the end of the KPC contract. The alternatives considered in this EIS present various site-specific means of achieving part of the schedule developed in the ten-year timber sale action plan. As a result, the cumulative effects depend not only on the alternatives presented in this EIS, but also on what might be expected under the direction detailed in the TLMP and the projected schedule in the ten-year timber sale action plan. The decisions made in the forest planning process represent long-range direction for the management of the Tongass National Forest for the duration of the plan.

The cumulative effects projected under any of the action alternatives are subject to changes when the TLMP Revision is complete. Decisions made during the revision process can provide for significant changes in management emphasis in any given portion of the National Forest. Cumulative effects as analyzed in this document include both the effects of this project and those projected by the TLMP Draft Revision, Alternative P.

The following assumptions were made to assess the reasonably foreseeable effects to the year 2004. These assumptions reflect current management and technology of national forests and provide a uniform approach to estimating effects of timber harvest and road construction.

- Laws, standards, guidelines, and Best Management Practices (BMP's) for resource protection would be followed. These requirements are expected to be at least as stringent in the future as they are today.

- Timber sale planning would occur in an interdisciplinary fashion.

- All acres of suitable commercial forest land would be equally subject to impacts.

- The no-action alternatives would represent only a delay in implementing the TLMP and, based on volume projections in the ten-year timber sale action plan, foreseeable cumulative effects would begin to occur before 2004.

- Future effects on resources from timber harvest and road construction would be similar to impacts projected for current alternatives.

Potential adverse environmental effects which cannot be avoided are discussed. Unavoidable adverse effects may result from managing the land for one resource at the expense of the use or condition of other resources. Many adverse effects can be reduced or mitigated by limiting the extent or duration of effects. Mitigation measures within standards and guidelines are specified for project activities to be implemented under the alternatives. These are discussed in detail in Chapter 2.

Short-term effects are those that occur annually or within the first ten years of project implementation. *Long-term productivity* refers to the capability of the land and resources to continue producing goods and services for 50 years and beyond.

Irreversible commitments are decisions affecting non-renewable resources such as soils, minerals, plant and animal species, and cultural resources. Such commitments of resources are considered irreversible because the resource has deteriorated to the point that renewal can occur only over a long period of time or at a great expense, or the resource has been destroyed or removed. The gradual decline in old-growth habitat or significant loss of soil productivity would be considered irreversible commitments. Land-use designations allowing land-altering activities were established by the Forest Plan, but the actual commitment to develop, use, or affect non-renewable resources in the CPOW Project Area was made during the development of this project.

Irretrievable commitments represent opportunities foregone for the period during which resource use or production cannot be realized. These decisions are reversible, but the production opportunities foregone are irretrievable. An example of such a commitment is the allocation of land-use designations (LUD's) that do not allow timber harvest in areas containing suitable and accessible timber lands, a decision that is made at the Forest Plan level. For the time over which such allocations are made, the opportunity to produce timber from those areas is foregone, and thus is irretrievable.

Irreversible and irretrievable commitments resulting from this project are discussed in more detail in the Other Environmental Considerations section at the end of this chapter.

Land Divisions

The land area of the Tongass National Forest has been divided in several different ways to describe the different resources and allow analysis of how they may be affected by Forest Plan and project level decisions. These divisions vary by resource since the relationship of each resource to geographic conditions and zones also varies. Four of these divisions are used for more than one resource, and are described briefly here.

Geographic Provinces. These are seven large land areas that are distinguished by differences in ecological processes. They are defined by a combination of climatic and geographic features. Geographic provinces are used in the Old Growth/Biodiversity and Wildlife sections, and are illustrated in the Biodiversity section.

Management Areas. The 1979 Forest Plan (USDA Forest Service 1979a, as amended) divided the Tongass into 141 management areas, five of which are in the CPOW Project Area; these are illustrated in Chapter 1. Each management area has area-specific direction and activity schedules. The Tongass Timber Reform Act (TTRA) directed that "proportionality" (see Chapter 1, and the timber section of this chapter) be analyzed using the management areas. The 141 areas are therefore preserved in this analysis, and are used to ensure that the proportionality requirement is met. (See TLMP Draft Revision, Proposed Revised Forest Plan, Chapter 5, for a detailed analysis.)

Value Comparison Units (VCU'S). These are distinct geographic areas, each encompassing a drainage basin containing one or more large stream systems. The boundaries usually follow watershed divides. The Tongass contains 867 VCU's; 27 are found in the CPOW Project Area and are illustrated in Chapter 1. They are used to describe the locations of specific resources in the Project Area.

Wildlife Analysis Areas (WAA's). These are land divisions designated by the Alaska Department of Fish and Game (ADF&G) and used by ADF&G and the Forest Service for wildlife analysis and planning purposes. Approximately 190 WAA's apply to the Tongass National Forest, and 7 to the CPOW Project Area. They are used in the Subsistence, Fisheries, and Wildlife sections of this EIS, and are illustrated in Chapter 3, Wildlife.

Geographic Information System

The Tongass National Forest has developed a computerized geographic information system (GIS) which was used for the development of this project. The GIS is a large database, containing information on many of the resources of the Forest. Much of the data consists of map "layers," each representing a particular resource or attribute (such as vegetative species, soil types, or recreation places). This system makes it possible to do spatial analyses of alternatives and effects, and to rapidly display resource information in map format. Numerical data can also be stored, displayed and analyzed.

General Project Area Description

The Project Area is mountainous, often rising abruptly from sea level to several thousand feet. Elevations of forested areas extend up to approximately 2,000 feet in the Project Area.

Climate and Precipitation

The configuration of the coastline, the warm Japanese ocean current, and the high coastal mountains provide the factors necessary to produce abundant rainfall. Storms and moderate to heavy precipitation occur year round, but most commonly from September through November. The abundant moisture feeds numerous streams, rivers, and lakes.

The CPOW Project Area has a maritime climate, resulting from the moderating influence of the Pacific Ocean. In the summer, this provides a cooling influence, while in winter, temperatures are warmer than would be expected for these latitudes.

Normal temperatures range from the mid-40's to the mid-60's in the summer, and from the high teens to the low-40's in the winter. During the warmer months, temperatures are highest inland and lowest along the coasts, while in the colder months, the reverse is true.

The CPOW Project Area has complete cloud cover about 85 percent of the year. October is generally the wettest month. High precipitation persists through the middle of November when intermittent snowfall occurs. Snowfall varies according to elevation and distance inland from the coast. Snow accumulation below 500 feet elevation is short-lived, generally melting off within a few days, due to warmer temperatures and rain.

Table 3-1 shows mean annual summer and winter temperatures, precipitation, and snowfall for portions of Prince of Wales Island, where the CPOW Project Area is located.

Table 3-1
Mean Yearly Summer and Winter Temperatures, Precipitation and Snow Accumulation for Four Communities on Prince of Wales Island

Recording Station	Mean Summer Temperature*	Mean Winter Temperature*	Mean Precipitation**	Mean Snow**
Cape Pole	52.8	33.8	106.13	51.3
Coffman Cove	55.0	31.2	79.07	67.6
Craig	55.0	34.8	106.47	35.7
Hollis	56.6	33.7	109.69	17.0

* Temperatures are in degrees fahrenheit
** Precipitations are in inches
SOURCE: Alaska Climate Center Technical Note No. 3. 1986.

Some Implications of Climate and Precipitation: Growing Degree Days (from DeMeo et al. 1992). Water, nutrients, light, and temperature are all important for plant growth. Each of these factors has a range where plant growth is optimized. With an average 300 cloudy days per year in the Project Area, light availability assumes critical importance; with cool temperatures year round, effective growing seasons are limited.

The number of growing season days where a temperature sufficient to support plant growth is available is referred to as growing degree days. The Ketchikan Area represents a transition area where growing degree days are becoming critically limiting for a number of species. Among plant species found in the Project Area, Western redcedar and swordfern are notable examples of species at or near their northern limit. Others species, such as mountain hemlock, are abundant but show an erratic frequency of occurrence. Such limiting factors have important implications for regeneration and other forest management considerations.

Disturbance

Disturbance (as used in ecology) refers to environmental fluctuations and destructive events which can happen at various scales across the landscape or over time. Examples of spatial disturbances include a single tree blowing down, or excessive water moving through a mountainside that triggers a landslide. Changes over time are referred to as succession; examples include a lake gradually filling in with aquatic vegetation, or a series of vegetational changes following logging of a unit (DeMeo et al. 1992).

In Southeast Alaska and the Project Area, the single most important natural disturbance factor is frequent, small-scale windthrow, or the blowing down of trees by high wind. While large-scale windthrow events do occur, the landscape here is most affected by continual, year-to-year patterns of a few trees to a few acres of trees blowing down and regenerating. Windthrow is a critical element in forest management in the Project Area (DeMeo et al. 1992).

Other natural disturbances at work on the Project Area include the disturbance of forest soils by moving water or by soil mass movement. These are discussed in detail in the Soils section.

Other Characteristics

The forests, shorelines, streams, and rivers of Southeast Alaska provide habitat for over 300 species of birds and mammals, including both nongame animals and animals such as black bear, Sitka black-tailed deer, moose, wolf, mountain goat, beaver, otter and marten. Many of these are found in the Project Area. The coastline provides an ideal habitat for a large population of bald eagles, and wetlands provide nesting habitat for many waterfowl.

A highly productive marine environment includes an abundance of marine mammals, halibut, herring, and hundreds of shellfish. Both resident and anadromous fish are found within and adjacent to the Project Area, including four species of Pacific salmon, Dolly Varden char, and trout.

Site-specific information on biological resources in the Project Area follows in various sections of this chapter.

AIR QUALITY

Affected Environment

Key Terms
Ambient Air - air (outside of buildings) encompassing or surrounding a specific region **Ambient Air Quality Standard** - the prescribed level of pollutants in the outside air that cannot be exceeded legally during a specified time in a specified geographical area **Class II Airshed** - the second of three classes of areas provided for in the Clean Air Act (Class I areas are the "cleanest"). Class II Airsheds have no specific criteria that must be met to attain and maintain ambient air quality standards.

Although there is little scientific information on the baseline air quality of the CPOW area, the air quality of the region is generally good. Exchange of air typically comes from relatively pollution free air off the Gulf of Alaska. Local sources of airborne particulates in the immediate Project Area include vehicle emissions, dust, residential and commercial heating, and other sources in Thorne Bay and other small communities, and a limited amount of timber site preparation burning. The largest air pollution source in the Ketchikan Area is the KPC pulp mill in Ketchikan, whose outputs are related to the amount of timber processed.

The State of Alaska Department of Environmental Conservation (ADEC) has the primary responsibility for attainment and maintenance of Ambient Air Quality Standards under the provisions of the Clean Air Act (see TLMP Draft Revision 1991a for related air quality discussion). The entire Project Area is a Class II airshed and does not have specific attainment criteria under the Clean Air Act. The USDA Forest Service cooperates with ADEC to protect air quality in the region's national forests.

Effects of the Alternatives

There is presently little information on the possible effects of ambient air quality on forest resources and the human environment in Southeast Alaska. Forest health monitoring recently initiated under a national resource program includes air resource related parameters. Methods of conducting inventories are being developed to address this information need. Monitoring of baseline resource conditions on the forest is being conducted at this time.

It is unlikely that the proposed action alternatives would significantly change air quality conditions. Direct air quality effects from forest management activities are temporary and limited in nature, resulting in dust and vehicular emissions from logging operations and smoke from a very limited prescribed fire program. Smoke from prescribed fires is managed by developing burning plans and prescriptions to minimize environmental effects upon air quality.

The proposed action would result in a continued supply of raw wood products to the Ketchikan Pulp Company mill at Ketchikan. This could indirectly affect air quality in the immediate area of the mill since air emissions from the plant are directly related to the amount of timber being processed. The likely result will be a continuation of the existing local ambient air quality. (The Water Resources section of this chapter contains a more detailed discussion of the effects of continued pulp mill operation on water quality.)

The long-term and cumulative effects of the proposed action alternatives upon air quality are unknown.

OLD GROWTH AND BIODIVERSITY

Key Terms

Biodiversity - The variety of life and its processes
Canopy - uppermost layer of foliage in the forest
Corridor - a patch or strip of habitat linking or providing connectivity between larger patches
Edge - boundary between two distinct ecosystems, such as between forest and muskeg
Forage - to search for food
Fragmentation - reducing the size and connectivity of habitat patches; the degree and impacts of fragmentation depend on scale (in space and time) and the life requirements of the affected species
Patch - an assemblage of similar vegetation, such as old-growth forest
Snag - standing dead tree
Viable Population- a population with the estimated numbers and distribution of reproductive individuals to maintain the population over time

Affected Environment

Old-Growth Forest

Most of the commercial forest land in the Tongass National Forest that has not been previously harvested has been undisturbed for centuries and is considered old growth. The definition of old-growth forest varies by habitat and includes such factors as age and size of trees, spacing, snags, canopy layers and structure, and the amount of down (on-the-ground) material (USDA Forest Service 1991a).

Old-growth stands have an uneven appearance because they contain trees of many ages, sizes, and condition, and contain numerous dead tops and snags. Based on past forest inventories, old-growth stands are assumed to have reached an equilibrium where timber growth equals mortality (USDA Forest Service 1991a). Tree establishment largely depends on large woody debris (logs and stumps) (Harmon 1986, Harmon and Franklin 1989) and gap formation (Alaback 1988). Woody debris provides microsites for trees to grow on. Gaps created by windthrow or other disturbances allow light to penetrate to the forest floor. This process of tree death and replacement is continual; in any one year, a significant portion of the trees in individual stands are likely to blow down (Harris 1989). Thus the forest is a mosaic of older and younger trees, dynamically changing yet remaining remarkably stable as a forested ecosystem (Bormann and Likens 1979, Alaback 1988, Schoen et al. 1988, Franklin 1990).

Old-growth forest is an important source of highly valuable forest products. Sitka spruce and western hemlock are eminently suitable for the production of dissolving

pulp, used in the manufacture of rayon, acetates, and other synthetic fibers. The better grade trees of these species, along with the cedars, provide some of the finest quality commercial timber for lumber.

Old-growth forest is also important wildlife habitat for old-growth associated species such as Sitka black-tailed deer, martens, black bear, Vancouver Canada geese, and cavity or snag dependent species such as flying squirrels, woodpeckers, and owls. Many species have evolved to use the structural attributes of old-growth forests. The combination of a dense canopy with scattered openings allows forage growth under openings, while the large limbs within the canopy intercept enough snowfall to provide winter food and thermal cover for deer and other species. The large, dense stems also provide some measure of thermal insulation in the winter, as well as during cold rains in the spring and summer. Large dead or defective trees become nesting sites for martens, owls, eagles, wrens, and chickadees, as well as feeding sites for woodpeckers, sapsuckers, brown creepers, and others.

Old-growth stands contain trees of many ages, sizes, and condition, as well as dead and dying trees and downed woody material.

The value of old-growth forest for wildlife habitat is also thought to transcend individual stands. Large, contiguous, unfragmented blocks of old-growth forest are important to forest interior species, such as the northern goshawk and marbled murrelet. The large old-growth blocks provide expansive hunting territories and protection from predators, and promote genetic mixing among populations that would be less likely to breed if they were spatially separated by forest fragmentation. Deer use these large old-growth blocks for migration routes between winter and summer ranges.

Old-growth forests are an important but decreasing component of the temperate rain forest ecosystem. They differ in ecological function in many ways from younger, even-aged forests. Old-growth stands typically exhibit a wider variety of reproductive niches for species whose existence is thought to be old-growth dependent—including

certain animals, understory plants, and microorganisms which appear to be most successful when permitted to develop under at least a partially intact mature forest canopy.

Old-growth forests also have become important to many people for aesthetic and cultural purposes. Ancient large trees characteristic of some old-growth stands have become symbols of a pristine landscape.

CPOW Old-Growth Blocks

Within and immediately adjacent to the Project Area are large, unroaded blocks of old-growth forest (Table 3-2 and Figure 3-1) as identified in the roadless inventory in the TLMP Draft Revision (1991a). The Thorne River block (#511) extends beyond the south boundary of CPOW. This block contains approximately 91,530 acres. Just south of the Thorne River block is the 56,230 Karta block (#510), which also includes an additional 39,894 acres for the Karta Wilderness. The Kogish block (#509, 72,261 acres) is just west of the Karta block and south of the Project Area. In the north portion of the Project Area is the 64,956 Sarkar block (#514), which includes the Sarkar Management Area. The Sarkar block extends east to the Sweetwater/Barnes Lake area. The last, and smallest roadless area is the Ratz block (#512), which is 6,586 acres, located on the east shore of Prince of Wales Island, just south of Coffman Cove.

Figure 3-1 shows these and other large blocks of old-growth forest, while the Existing Condition Map in the separate map packet shows all remaining unharvested, old-growth, commercial forest within the Project Area.

Table 3-2
Roadless Areas and Acreage Within and Adjacent to the CPOW Project Area

Roadless Area #	Roadless Area Name	Roadless Area Acreage
509	Kogish	72,261
510	Karta	56,320
511	Thorne River	91,530
512	Ratz	6,586
514	Sarkar	64,956
Karta Wilderness		39,894
TOTAL		331,547

It is recognized that maintaining appropriate habitat corridors or connections between blocks of old-growth forest habitat is important to minimize isolation and gradual decline of wildlife species associated with the old-growth blocks (Harris 1984, 1985; Hunter 1990). At a minimum, inter-connectivity among all these blocks in the CPOW area is provided by smaller individual stands of old growth. In addition, while Figure 3-1 displays the areas that are not roaded or developed, Figure 3-2 displays large blocks of old-growth forest and areas that are important for maintaining connectivity between the large blocks.

Figure 3-1
Roadless Areas Within CPOW Project Area

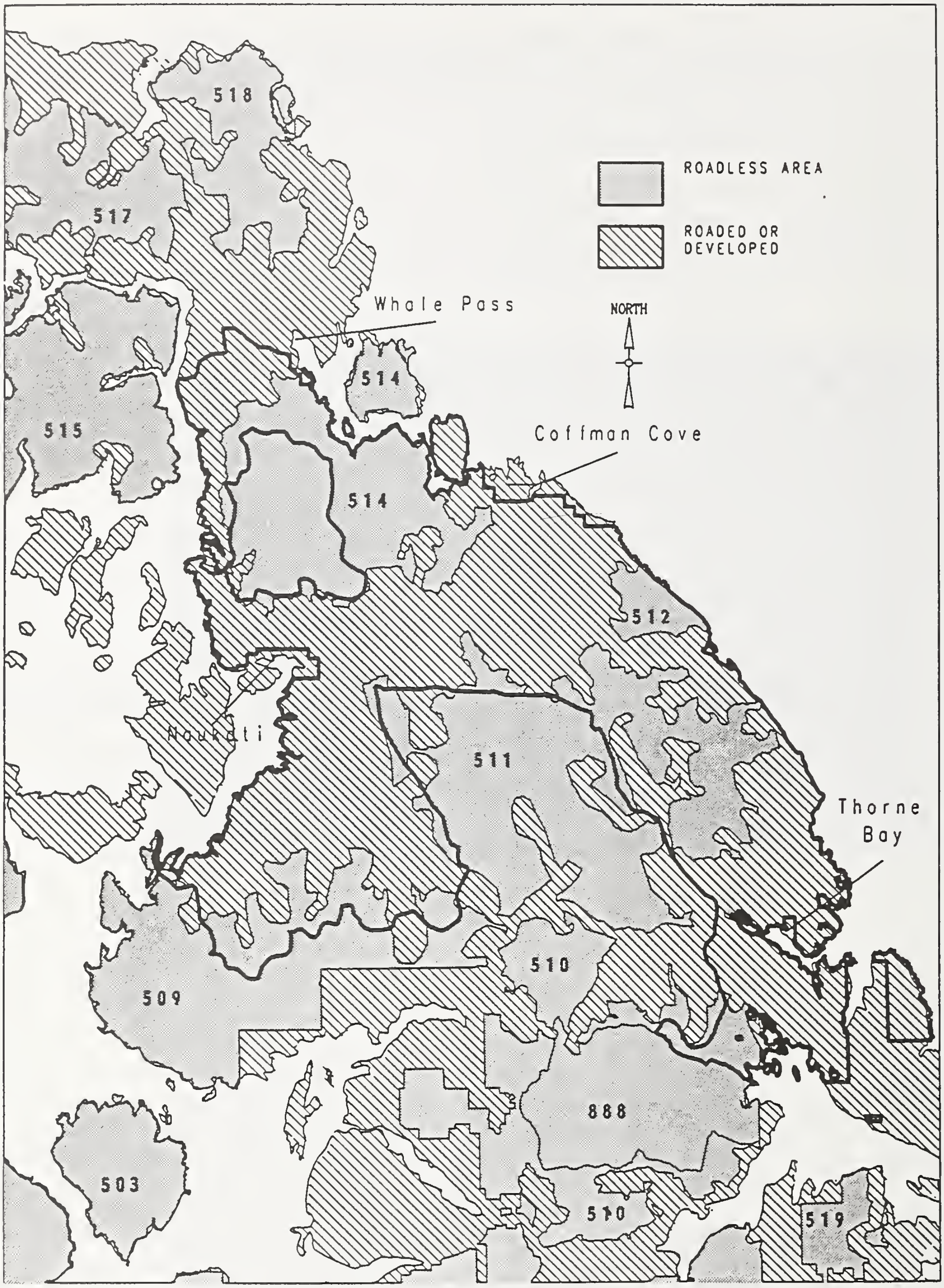
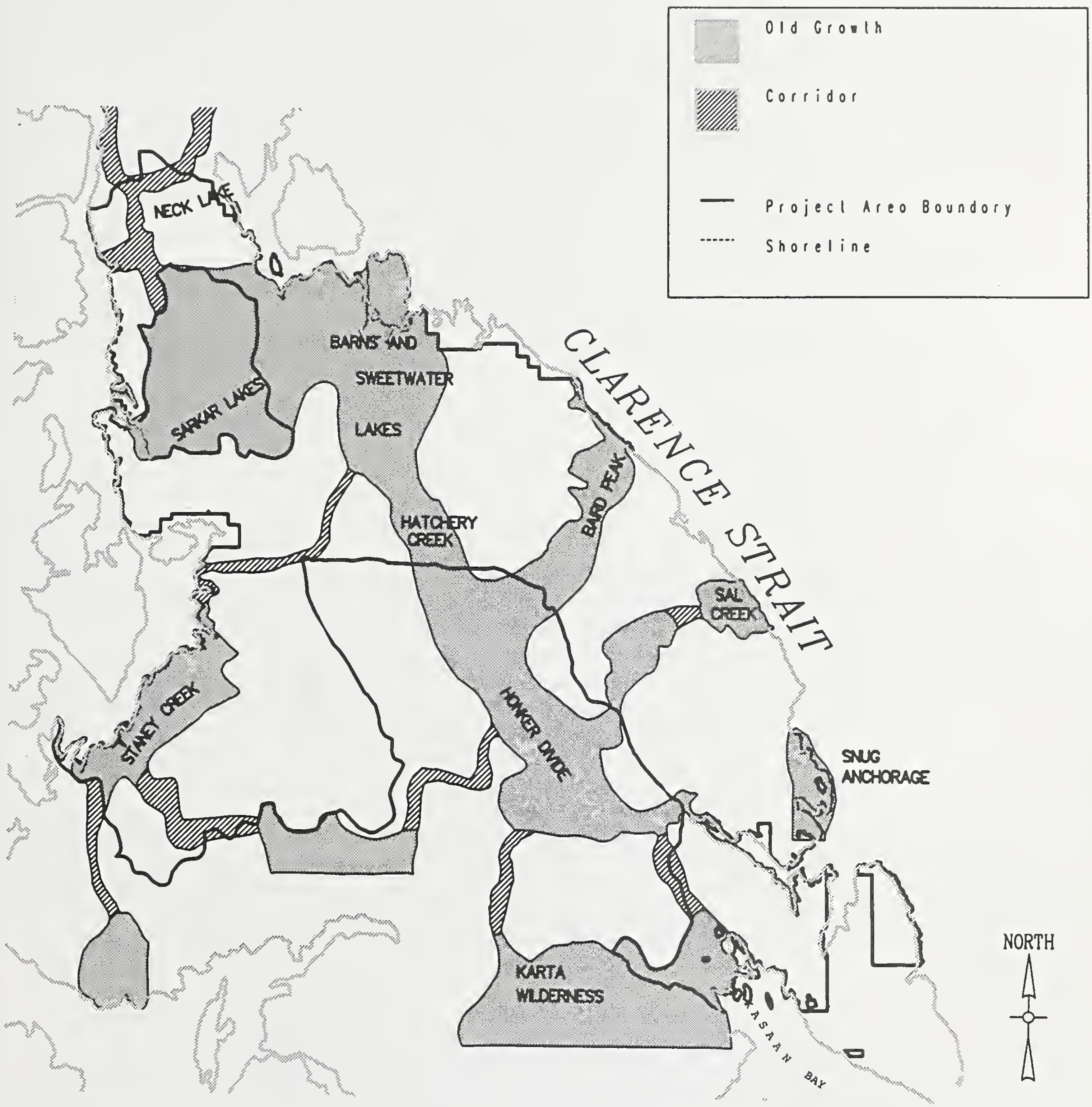


Figure 3-2
Important Old-Growth Blocks and Corridors



Large blocks of old-growth forest, and other areas that are important for maintaining connectivity between the large blocks.

The largest contiguous block of old-growth forest within the Project Area extends from the Sarkar Primitive Recreation Area eastward through the Mabel Creek, and Gold and Galligan drainages to Barnes Lake. This corresponds to Sarkar roadless area (# 514). While some of this area is naturally fragmented by muskegs and low volume stands, none of the area has been roaded and only minor beach logging has occurred along Whale Passage. Areas adjacent to Mabel Creek estuary, Gold and Galligan Lagoon, and Barnes Lake were identified for retention in the 1989-94 LTS EIS.

North from the Sarkar Primitive Recreation Area is the Neck Lake corridor. This is a critical connection between central Prince of Wales Island and the northern portion of Prince of Wales Island. This corridor has been affected by previous timber harvest, and its effectiveness is questionable. This corridor also contains a string of areas designated for retention in the 1989-94 LTS EIS.

The old-growth around Sweetwater Lake and Hatchery Creek is important for maintaining the connectivity between Honker Divide and the Sarkar/Barnes Lake old-growth patch. The old-growth matrix in this area contains a moderate amount of scattered clearcuts. The existing old-growth around Sweetwater Lake and a limited amount along Hatchery Creek was identified as retention by the 1989-94 LTS EIS.

The Baird Peak old-growth block corresponds to the Ratz roadless area (# 512). Timber harvest around Luck Lake and Ratz Harbor/Big Lake area is starting to isolate this block from other old-growth patches. Connectivity is still maintained to Honker Divide. A large block of high volume old-growth adjacent to the beach was identified as retention in the 1989-94 LTS EIS.

The Sal Creek old-growth matrix contains scattered clearcuts and, like Baird Peak, is becoming isolated. Connectivity of this patch to Honker Divide is maintained through the Snakey Creek area. This old-growth patch helps maintain wildlife habitat distribution thoughout the Project Area.

The Snug Anchorage old-growth block has been isolated from other old-growth patches by the large areas of timber harvest in the Thorne Bay area. Connectivity to the Sal Creek old-growth block is along the beach fringe, and some of that has been previously harvested.

The Rush Peak/Paul Youngs Creek old-growth block is adjacent to the Karta Wilderness. Some minor timber harvest occurred in the Rush and Brown mine area approximately 70 years ago. This is a high value wildlife area because it is adjacent to a highly productive salt chuck. Much of the old growth in this block was identified for retention by the 1989-94 LTS EIS. Connectivity to Honker Divide is maintained though the Goose Creek/Angel Lake area and the Rio Roberts drainage basin.

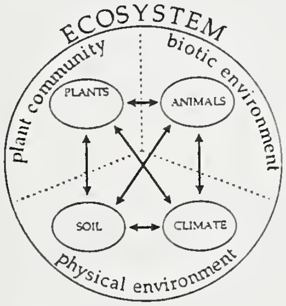
The Staney Creek block helps maintain wildlife habitat distribution throughout the Project Area. The old-growth matrix contains a high percentage of scattered clearcuts. Much of the beach fringe was identified for retention by the 1989-94 LTS EIS. Adjacent to this block is another block of old growth that was included in 1989-94 retention. Connectivity with other old-growth blocks is maintained along the beach fringe to unharvested areas south of the Project Area and to the Sarkar/Barnes Lake block to the north. The beach fringe to the north has been heavily affected by timber harvest. Connectivity to the Sweetwater/Hatchery Creek block occurs along Logjam Creek. This is mostly a narrow stream buffer corridor.

If the TLMP Draft Revision (1991a) is implemented, the large, unfragmented blocks within Honker Divide and Sarkar/Barnes Lake will become increasingly fragmented, and the roadless areas will become smaller in size. This will place more reliance for old-growth habitat on the LUD I (Karta Wilderness) and LUD II (Calder Mountain, Salmon Bay, and Sarkar Lakes) areas. In the future, inter-connectivity between these blocks could be partly maintained by the 500-foot beach fringe and 1,000-foot estuary buffer, as well as by streamcourse buffer strips, though such strips may be too narrow for some wildlife species (Harrison 1992). Of particular significance are the Thorne River and Hatchery Creek systems, which would be the major path for wildlife movement from the Karta Wilderness Area north throughout the Project Area.

Other areas—including stands deemed inoperable for timber harvest because of unstable soils, steep slopes, economic isolation, or other factors—could also be interspersed and provide additional opportunities to connect old-growth blocks, although the TLMP Draft Revision Alt. P has scheduled almost all these lands for harvest. While there has been historic timber harvest within the beach, estuary, and streamcourse buffers, these old harvest sites will mature in time and could provide travel corridors for some wildlife species for genetic interchange.

For additional discussion of old growth and connectivity, see Fragmentation and Connectivity, later in this section.

Biological Diversity and Viable Populations



Biodiversity

The National Forest Management Act (NMFA) defines diversity as the distribution and abundance of different plant and animal communities and species. Biological diversity, or biodiversity, refers not only to the variety of organisms in an area; it also includes their genetic composition, the complex pathways that link organisms to one another and to to the environment, and the processes that sustain the whole system. Biodiversity plays a key role in how well an ecosystem functions. It can be evaluated at different scales, ranging from genetic diversity to landscape diversity.

Genetic diversity is the smallest scale, and refers to the variation in the genes of individual plants, animals, and microorganisms. There is concern when individuals of a species do not reproduce very well (such as Pacific yew) or do not show much variation among individuals. *Species diversity* refers to the variety of living organisms—ranging from beetles to bears, from mosses to massive trees. This scale not only includes the number of different species in an area, but also their abundance and distribution. Loss of genetic diversity and/or severe reductions in the size of populations can subject plant and animal species to increased risk of local extinction (extirpation).

This risk of genetic and species loss is higher if the structure, composition, or function of vital habitats are compromised. An example of such a compromise might be fragmentation of large blocks of suitable habitat into smaller isolated blocks that separate small populations of wildlife species from each other. In managing forest ecosystems, therefore, biodiversity management is often evaluated at larger scales. It is thought that conservation of functioning ecosystems will serve to conserve the suite of species associated with them (DeMeo et al. 1992).

One of these larger scales of diversity— *"within-ecosystem"*— focuses on plant associations and habitat types and the diversity of plants and animals within those

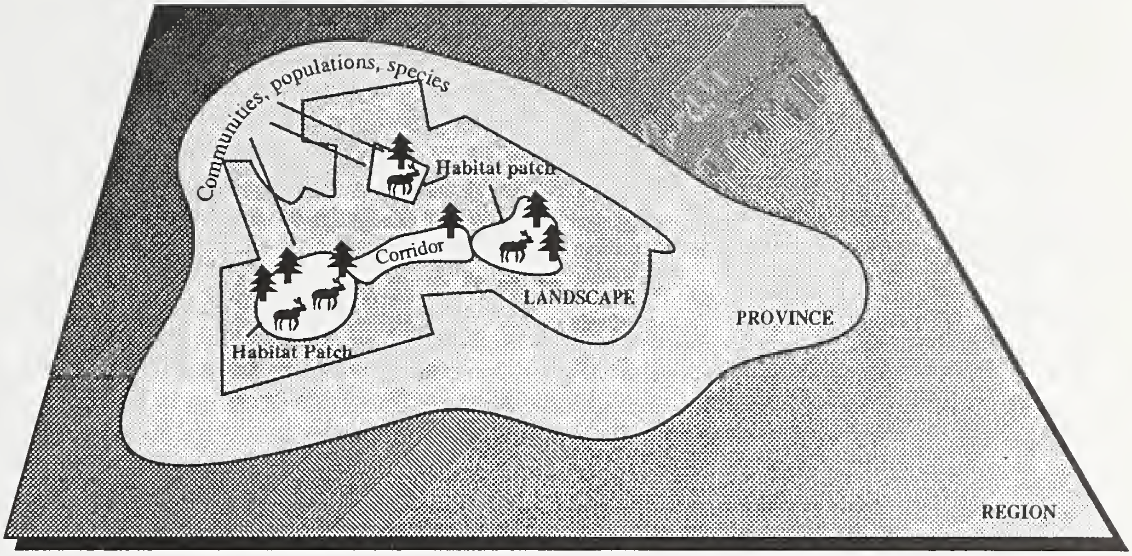
communities. This diversity scale usually measures the number of species present (richness) or the structural complexity of a given habitat type. For example, the number of breeding birds in Southeast Alaska has been shown to decline from 13 species in old-growth, spruce-hemlock forests to just 3 species immediately following logging (seedling/sapling stage) as vegetation structure and species composition become greatly simplified (Sidle 1985). As clearcuts (seedling/sapling stage) procede to mid-successional stages (sapling/shrub and pole), species richness temporarily increases to 10 to 14 species, but declines again to seven species in older seral stages (young sawtimber) due to the loss of understory vegetation associated with canopy closure. Retention of snags, live trees, and down woody debris can be used to enhance within-ecosystem diversity by maintaining a portion of old-growth structure within regenerating stands (Sidle 1985, DellaSala 1993).

The next scale is *"between-ecosystem"* diversity, which describes the variation from one community to another in a particular area along environmental gradients. Southeast Alaska has a high between-ecosystem diversity, because natural forested patches are relatively small (compared to Oregon and Washington, for example) and are often interspersed in a matrix of muskegs. Large-scale logging can affect this diversity, because it increases the fragmentation of old-growth patches, and is followed by a subsequent uniform age class of second growth that is quite different both from the adjacent old growth and from the muskeg matrix.

The largest scale considered is the diversity of *ecosystems across a landscape*, such as a province or biogeographic region. At this scale, differences in geology—for example the karst region on northern Prince of Wales—and climate come into play. Large areas of several million acres are evaluated and subdivided into ecological provinces and subprovinces (as in the TLMP Draft Revision, 1991a). An area is expected to support high levels of landscape diversity if viable populations of wildlife and habitat types are well distributed across the region. Evaluation of this scale of diversity is important for a number of reasons. Silviculturally, for example, a plant association on limestone-derived soils may respond differently following logging than the same plant association on glacial soils. The frequency of certain forest structural patterns (size and distribution of trees) may also differ on different soils, with profound implications for wildlife habitat.

Diversity must be evaluated at all these different levels, because ignoring scale can lead to adverse effects on ecosystem function. For example, for years it was thought that maximizing forest fragmentation (the "staggered setting" approach) would benefit wildlife, because it maximized forest edges (boundaries between ecosystems). More recent research has suggested, however, that maximizing edge can threaten forest interior conditions critical for certain species (Forman and Godron 1986, Hunter 1990).

Ecosystem alteration—including habitat destruction, simplification, and fragmentation—is the most pervasive cause of biodiversity loss. Therefore, minimizing habitat alterations and promoting natural patterns help maintain biodiversity. To maintain biodiversity, large natural areas, corridors, and migration routes should be protected; removal of natural barriers should be avoided; areas that have already been developed should be utilized in place of altering undisturbed areas and restoring areas that have been altered. In natural resource management, it is sometimes necessary to focus on what is more limiting (e.g., large old-growth patches) or rare (e.g., possibly some plant or animal species), and to seek to maintain these aspects of the ecosystem, rather than to focus strictly on maximizing the number of species.



Biodiversity is a measure of the species and ecological processes that occur at various scales. Relationships within and between scales are critical components of biodiversity. In the Forest Service, biodiversity is evaluated primarily at the province and region scales.

- Adapted from Diaz and Apostol 1992

The amount of contiguous habitat, and the extent to which similar habitats connect by corridors, are considered key concepts in managing for biological diversity (Harris 1984, 1985; Hunter 1990). Because of the importance of unfragmented old-growth forest patches and the role of these areas in maintaining viable wildlife populations, old-growth habitat and an analysis of patch-size effectiveness will be used in this EIS as tools to evaluate impacts on biodiversity.

For detailed discussion of old-growth blocks and connecting corridors in the CPOW Project Area, see CPOW Old-Growth Blocks, earlier in this section, and Fragmentation and Connectivity, later in this section.

A more detailed discussion of Tongass National Forest direction for managing biological diversity can be found in the TLMP Draft Revision, 1991a, Vol. 149, pp. 3-9–3-45.

Viable Populations

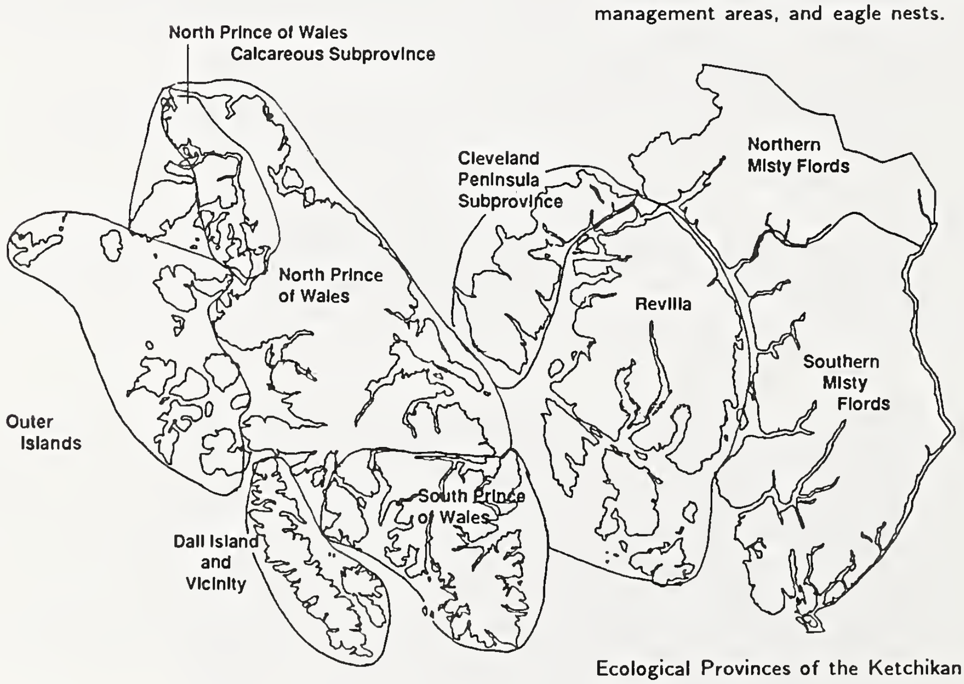
Fish and wildlife habitat must be managed to maintain viable populations of existing native and desired non-native vertebrate species in the planning area. For planning purposes, a viable population is one that has the estimated numbers and distribution of reproductive individuals needed to ensure its continued existence, and is well distributed in the planning area (NFMA 1976). In order to maximize the probability that viable populations will be maintained over time, habitat must be provided to support at least a minimum number of reproductive individuals, and that habitat must be well distributed so that those individuals can interact with others in the forest planning area.

The task of maintaining habitats to support biodiversity has encompassed several methodologies, and alternatives continue to evolve. Prior to the TLMP Draft Revision, the Ketchikan Area established old-growth habitat areas (retention and extended rotation) that were to be retained partially to maintain biodiversity. The TLMP Draft Revision (1991a) refocused its biodiversity and population viability management strategies at the ecological province level, and took a broader regional view. Recent efforts to further refine the process of biodiversity and population viability management led to the convening of an Interagency Viable Population Committee on the subject, discussed below.

The TLMP Draft Revision provides for regional management and maintenance of population viability at the planning area level. "Planning Area" for defining viable populations is the ecological province level (TLMP Draft Revision 1991a). Under TLMP, individual project areas are not expected to independently maintain viable populations, but only to contribute to and not cause a decline of overall viable populations for the province. However, their contribution to well-distributed populations through the maintenance of connectivity is critical. Standards and guidelines outline prescriptions for maintaining biodiversity at the project area level (TLMP Draft Revision 1991a).

The Central Prince of Wales (CPOW) Project Area lies within the North Prince of Wales Island Ecological Province, as defined by TLMP. The North Prince of Wales Island Ecological Province is comprised of 1,260,553 acres, of which 251,898 acres* are designated for preservation in a natural setting under the terms of Alternative P for the TLMP Draft Revision (1991a). This province includes all of Prince of Wales north of a line from Cholmondeley Sound to Hetta Inlet. It also includes the islands of Sukkwan, Tuxekan, and Kosciusko, and numerous smaller adjacent islands.

* This 251,898 acres is composed largely of LUD I and II areas, as well as buffers for beach fringe, estuaries, streams, riparian management areas, and eagle nests.



Ecological Provinces of the Ketchikan Area, Tongass National Forest

VPOP Committee

"Two habitat conservation areas (HCA's) were identified within the CPOW Project Area: Honker Divide (34,268 acres) and Staney Creek (22,631 acres)."

In an effort to further refine the methodology by which viable populations are maintained, an interagency committee appointed by the Forest Service was assembled (Viable Population [VPOP] Committee) to assess whether some species associated with old-growth forests required special standards and guidelines to ensure that their populations remain viable and well distributed across their current ranges on the Tongass National Forest (internal Forest Service memo, August 22, 1991, J. Capp, Chair, Viability Steering Committee). The VPOP Committee focused on viability risk assessments that could be applied to the evaluation of planning alternatives Forest-wide. The VPOP Committee recommended habitat conservation areas (HCA's) of three sizes: large, medium, and small (Suring et al. 1993). The three different HCA's could be applied to individual planning areas or to multiple planning areas provided sufficient connecting corridors are present to permit dispersal of wildlife across HCA's. The committee formulated criteria for establishing HCA's.

For a large HCA, a tract should include at least 20,000 acres of old growth with over 8 MBF per acre, including at least 10,000 acres with over 20 MBF per acre within a total area of at least 40,000 acres. Large HCA's should be no more than 20 miles apart, edge to edge, to ensure effective dispersal between them. HCA's with these characteristics are believed to be necessary to ensure that viable populations of wide-ranging species such as marten are well distributed within an analysis area.

A medium HCA would encompass at least 5,000 acres of old-growth forest with over 8 MBF per acre, including at least 2,500 acres of old-growth forest with over 20 MBF per acre within an area of at least 10,000 acres. Medium HCA's would be capable of supporting at least five female martens during winters of poor prey (Suring et al. 1992).

Small HCA's would encompass at least 800 acres of old-growth forest having over 8 MBF per acre within an area of at least 1,600 acres. Small HCA's would be capable of supporting at least one female marten during winters of poor prey. Small HCA's are maintained to provide temporary functional habitat for wildlife dispersing between large and medium HCA's. The small HCA's also contribute to the landscape matrix between large and medium HCA's.

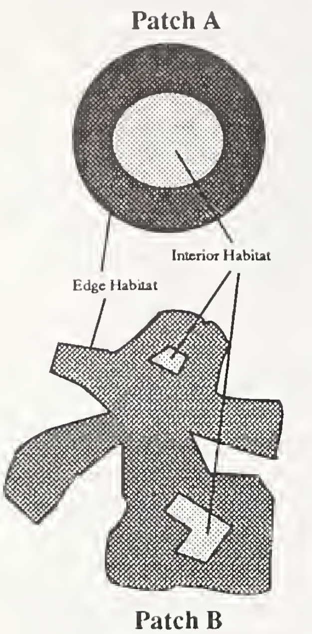
Within the CPOW Project Area two large, fairly intact blocks of old-growth forest were recommended to the TLMP Draft Revision Planning team (4/91) to be retained as large and medium HCA's. The large HCA was in the Honker Divide area (approximately 34,268 acres), and the medium HCA is in the Staney Creek area (approximately 22,631 acres)(see Figure 1-8, Chapter 1).

Fragmentation and Connectivity

The extinction of a species is a serious and irreversible threat to the long-term well being of humans, and habitat loss and fragmentation are prime causes of extinction today. Fragmentation occurs whenever a large continuous habitat is transformed into smaller patches that are isolated from each other, such as occurs from catastrophic windstorms or from extensive clearcutting. The changed landscape functions as a barrier to dispersal for species associated with the original habitat. These smaller and more isolated habitats also support smaller populations, which are more vulnerable to local extinction.

Research shows that forest fragmentation results in an increased ratio of forest "edge" to forest "interior" habitat, and can have a strong negative effect on forest interior species. One such effect is that as more edge habitat becomes available as a result of fragmentation, the edge-dwelling species invade the interior environment and become

a major threat to the survival of the forest interior species. Rosenberg and Raphael (1986) recommended a minimum stand size of 50 acres when delineating old-growth habitat, and suggested that when a stand is greater than 50 percent isolated, the minimum stand size should be 124 acres. (This is in excess of the maximum opening size (100 acres) specified by NFMA for the western hemlock/Sitka spruce forest type associated with Southeast Alaska.) By maintaining large contiguous blocks of habitat, the forest interior species would realize less competition and predation from open forest and edge species.



Patch B has greater total area, but Patch A has greater interior habitat. Increased "edge" in Patch B can be detrimental to forest species dependent on interior habitat.
- adapted from Diaz and Apostol 1992

Patch Sizes. The analysis of forest fragmentation in the CPOW Project Area was based on the total number of old-growth forest patches within specific size classes. Patch size classes were selected to represent MIS requirements based on the species patch size effectiveness curves and HCA recommendations of the VPOP Committee (Tables 3-3 and 3-4; see also box on next page). Old-growth forest patches were defined as the amount of contiguous old growth of Volume Class 4 and above.

Table 3-3
Patch Size Class Relationships

Patch Size (Acres)	Species Relationship
0–25	Incorporates various patch size effectiveness factors
26–100	Incorporates optimal patch size for brown creeper
101–500	Incorporates optimal patch size for marten
501–1,000	Small HCA's, incorporates optimal patch size for woodpeckers
1,001–5,000	Small HCA's, incorporates optimal patch size for deer
5,001–10,000	Medium HCA's
> 10,000	Large HCA's

SOURCE: Workshop to recommend patch size relationship and corridor requirements for the MIS and TES species.

Table 3-4
Patch Size Effectiveness Curve Values by Patch Size Class and by Species

	Patch Size Classes (Acres)						
Species	0–25	26–100	101–500	501–1,000	1,001–5,000	5,001 10,000	>10,000*
Sitka b-t deer	0.3	0.35	0.5	0.83	1.0	1.0	1.0
Marten	0.2	0.5	1.0	1.0	1.0	1.0	1.0
Hairy wdpcker	0.1	0.42	.7	1.0	1.0	1.0	1.0
Brown Creeper	0.8	1.0	1.0	1.0	1.0	1.0	1.0

* Represents the median curve value within each patch size class from the species effectiveness curves.
SOURCE: Workshop to recommend patch size relationships and corridor requirements for the MIS and TES species.

Patch Size and Corridor Requirements of MIS and TES Species

An interdisciplinary group of biologists from ADF&G, Forest Service, and the U.S. Fish & Wildlife Service (1989) categorized management indicator species (MIS) and threatened and endangered species (TES) into one of three groupings based on how the species generally utilize or respond to their environment with regard to needing minimum habitat patch sizes and/or dispersal corridors.

Landscape: Wildlife species in this category generally have large seasonal or year-long home ranges and territories. These species are capable of utilizing a wide variety of vegetative conditions, although preferences for certain vegetation types exist which provide a higher quantity/quality of forage or cover needs. These species will travel or move through a wide variety of habitats to utilize their environment; therefore, these species do not have specific patch size or corridor requirements.

Community: Wildlife species in this category generally have smaller home ranges and territories than the landscape species. These species show a high preference or requirement for a particular vegetation community or combination of communities, especially during the season of the year that is considered critical. Preferred or required habitats may need to be within mean dispersal distances the the species, and corridors may be needed. These species generally show a relationship with patch size of the preferred or required habitats. In some situations, as patch sizes are reduced, a species may be displaced by another species which can more effectively use the habitat.

Structural: Wildlife species in this category require a specific or unique habitat element or site, such as a pond or cliff for nesting. Often, the size, location, and abundance of these sites are the result of natural geologic or climatic events rather than the effects of management.

Each of the MIS and TES species that occurs within the CPOW Project Area was placed within one of the above groups, as follows:

Landscape	*Structural*	*Community*
Black bear	Bald eagle	Marten
Gray wolf	Trumpeter swan	Hairy woodpecker
River otter	Peregrine falcon	Brown creeper
		Marbled murrelet
		Vancouver Canada goose
		Sitka black-tailed deer

For the species within the landscape and structural groups, no specific patch size or corridor requirements are needed. For the species within the community category, the committee identified types of vegetative communities or habitats that are applicable to patch sizes and corridor requirements for each species. These include:

Marten: patch size includes the acres of all conifer stands from older second growth through old growth; corridor requirements include all conifer stands from pole timber through old growth.
Hairy woodpecker: patch size includes all old-growth conifer stands plus older second-growth stands; there are no corridor requirements for this species.
Brown creeper: patch size includes all volume class 5+ old-growth conifer stands; there are no corridor requirements for this species.
Marbled murrelet: patch size includes all old-growth conifer stands; there are no corridor requirements for this species, as it has been observed flying above treetops in the subalpine and alpine habitats.
Vancouver Canada goose: adequate information was not available to develop patch size relationship for this species. These birds are highly mobile and are found throughout the islands of Southeast Alaska. No vegetative corridor requirements have been identified.
Sitka Black-tailed deer: patch size includes all old-growth conifer stands; there are no specific corridor requirements.

The relationship of patch size to the effectiveness of that habitat to support a particular species was analyzed, and index graphs were developed. Table 3-2b displays a summary of the effectiveness of various patch size classes for the above CPOW MIS species.

Prior to timber harvest (1954), the Project Area contained extensive amounts of unfragmented forest patches that met the criteria of small, medium, and large HCA's (Figure 3-4, map of distribution of forest patches in 1954, later in this section). Approximately 92 percent of the old growth in volume class 4 and above throughout the Project Area was in forest patches greater than 10,000 acres (i.e., large HCA's). Timber harvest under the Long-Term Contract has decreased the acreage in this patch size class from 196,321 acres to 74,060 acres and the conversion of large patches to smaller patch sizes primarily in the 1,001-5,000-acre size class (see Figure 3-5, map of existing condition (alts.1, 1a), later in this section.

Fragmentation of existing old growth results in a reduction in the effectiveness of remaining patches as wildlife habitat. Individual species respond to natural and human-induced fragmentation differently; species like brown creepers and hairy woodpeckers can be supported by smaller patches of forest habitat than species such as deer and marten (Proceedings of workshop to recommend patch size relationships and corridor requirements for the MIS and TES species) (Table 3-3).

Patch-size effectiveness percentages for 1954 range from 100 percent (brown creepers) to 98 percent for deer (Table 3-5). The values for 1993 vary from 99 percent effective to 91 pecent effective. The greatest difference in percent effectiveness between 1954 and 1993 was for deer, which showed a 9 percent reduction in patch effectiveness.

Table 3-5
Adjusted Habitat Capabilities Based on Patch Size Effectiveness

Species	1954 W/o*	1993 W/o*	1954 With**	Patch Effect %	1993 With**	Patch Effect %
Sitka black-tailed deer	14,942	10,245	14,628	.98	9,272	.91
Marten	671	499	663	.99	481	.96
Hairy Woodpecker	7,725	3,395	7,594	.98	3,168	.93
Brown Creeper	17,725	5,594	17,690	1.00	5,572	.99

* Without patch effectiveness percent applied.
** With patch effectiveness percent applied.
SOURCE: MIS Habitat Capability Models.

Connectivity. The connectivity, or corridors, between habitat patches in a landscape may be at least as significant to maintaining diversity as the size of the patches (Noss 1983). Forman and Godron (1981) defined corridors as being of four types: (1) line corridors—those which are all edge and possess no interior habitat, (2) strip corridors—those which maintain interior habitat, (3) stream corridors—those bordering a water source, and (4) network corridors—those which intersect and form patterns. Corridors can function as more than one type; for example, when a stream corridor is wide enough to incorporate interior habitat, it also functions as a strip corridor. Forman and Godron's work also highlighted the fact that some interior species will not live in or even migrate through extensive lengths of unsuitable habitat, and that strip corridors were preferable to line corridors. Management of corridors as well as habitat patches should strive to mimic natural patterns (Noss and Harris 1986).

For detailed discussion of existing connectivity in the CPOW Project Area, see CPOW Old-Growth Blocks, earlier in this section.

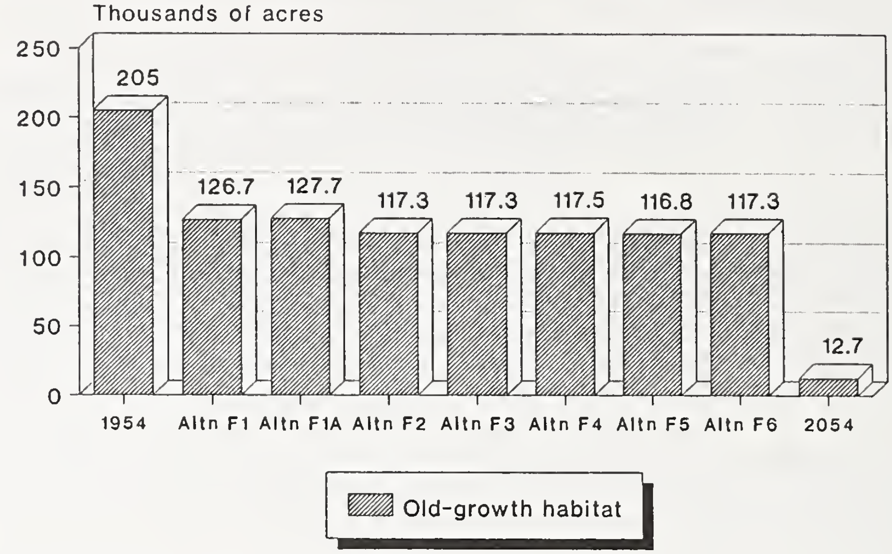
Effects of the Alternatives

Analysis conducted for the TLMP Draft Revision (1991a) indicates approximately 251,900 acres of old-growth forest would remain distributed throughout the planning cycle (150 years) within the North Prince of Wales Ecological Province to potentially support viable populations of Management Indicator Species (MIS). All alternatives proposed by this EIS provide areas that would remain connected by existing roadless areas, beach fringe and estuary fringe, stream corridors, and the myriad of muskegs, oversteepened slopes, and other areas unsuitable for timber harvest. Managed stands would change from multi-aged old-growth timber to even-aged stands of timber in early succession/understory colonization stage.

Following clearcut logging of old-growth forest, the stands that subsequently develop are even-aged (Harris and Farr 1974) and tend to contain a higher percentage of Sitka spruce and a lower percentage of the cedars. Clearcutting differs from natural disturbances in that it represents a large-scale change (up to 100 acres, typically) rather than dispersed small (1–20 acres, typically) blowdown patches. It also differs in that nearly all trees are felled, whereas in natural disturbances some trees remain standing or partially standing (Hansen et al. 1991).

There has been a national concern over the limited and dwindling supply of old-growth forest, as exemplified by the spotted owl controversy in Oregon and Washington. As the TLMP Revision is implemented, approximately 70 percent of the North Prince of Wales Ecological Province will be converted from old-growth forest to successive crops of younger trees which will be harvested before they mature into old-growth forest (TLMP Draft Revision 1991a). The subsequent crops of younger trees will yield more useable wood fiber per acre. At the same time, this conversion of old-growth forest to younger stands may cause some changes in the value of certain forest products, changed value of wildlife habitat, reduced diversity of ecosystem function and composition, and changes in inherent aesthetic qualities. Figure 3-3 displays the amount of old-growth habitat that existed in 1954, the effect of proposed alternatives on existing old growth, and the effect of harvesting most of the suitable-available forest land by 2140.

Figure 3-3
Effect of Proposed Alternatives on Total Old-growth Habitat in CPOW



Fragmentation and Patch Size Effectiveness

To help identify important blocks of old-growth habitat, a map was generated using Geographic Information System (GIS) that displayed all blocks of old-growth timber volume class 4 and greater. The patches were then categorized into the various acreage classes. This procedure was completed for the years 1954 (prior to logging) and 1993 (the current condition, Alt. 1 and Alt. 1a), and for alternatives F2-F6. These patches are displayed in Figures 3-4 through 3-6. Table 3-6 displays the acreage in each patch size class, for the year 1954, the existing condition (1993), and alternatives F2 through F6.

While no analysis was performed to assess the portion of forest edge in each block (thereby delineating interior old-growth conditions), the blocks can be compared against each other to form a relative comparison.

Table 3-6
Patch Size Acreage, by Alternative

Alt.	>10,000-Acre Patches	1,000-5,000-Acre Patches	500-1,000-Acre Patches	100-500-Acre Patches	0-100-Acre Patches
1954	196,321	6,607	1,859	3,002	3,897
1	74,061	34,129	11,132	11,275	8,536
1a	74,061	35,129	11,132	11,275	8,536
F2	70,217	31,934	9,863	10,187	8,073
F3	69,365	32,188	10,230	10,198	8,051
F4	70,148	32,094	10,065	10,060	8,115
F5	70,620	32,261	10,100	10,114	8,115
F6	69,726	32,158	9,795	10,294	8,171

Table 3-7 displays the results of patch-size effectiveness for deer, marten, hairy woodpeckers, and brown creepers (the only CPOW MIS species with patch size criteria requirements). The percent effectiveness for the alternatives ranges from 90.5 to 91.4 for deer, 96.2 for marten, 93.2 to 93.3 for woodpeckers and 99.5 for brown creeper. Note that none of the action alternatives are significantly different.

Table 3-7
Adjusted Habitat Capabilities Based on Patch Size and the Percent Effective by Alternative

Species	1954	1 1994	1a 1993	F2 1996	F3 1996	F4 1996	F5 1996	F6 1996
Sitka b-t deer	14,628	9,272	9,303	9,080	9,016	9,017	8,996	9,945
% effective	.979	.905	.905	.914	.906	.907	.907	.906
Marten	663	481	484	461	461	468	468	468
% effective	.988	.963	.963	.962	.962	.962	.962	.962
Hairy woodpecker	7,594	3,168	3,196	2,968	2,966	2,969	2,956	2,975
% effective	.983	.933	.933	.933	.932	.932	.932	.932
Brown creeper	17,690	5,572	5,650	5,246	5,258	5,253	5,244	5,292
% effective	.998	.996	.995	.995	.995	.995	.995	.995

SOURCE: Matson 1993, GIS database

Figure 3-4 represents the pre-harvest (1954) condition, while Figure 3-5 represents the existing condition (alts. 1, 1a), and Figure 3-6 shows the effect that the preferred alternative F5) would have on the existing large blocks of old-growth forest. Maps of the same information for alternatives F2, F3, F4, and F6 are provided in Appendix F. A schematic map is available in the planning record showing what might remain of the large blocks of old-growth forest if all the suitable and available timber is harvested, as assumed by the TLMP Draft Revision (1991a). Past timber harvest activity has significantly reduced the amount of old-growth forest in blocks greater than 10,000 acres, causing a corresponding increase in the amount of old-growth forest that is in blocks under 5,000 acres in size. The action alternatives make small reductions in the amount remaining in all size class blocks; the most significant is the removal of approximately 4,000 acres from the blocks greater than 10,000 acres.

Figure 3-4
Patch Size Effectiveness, 1954

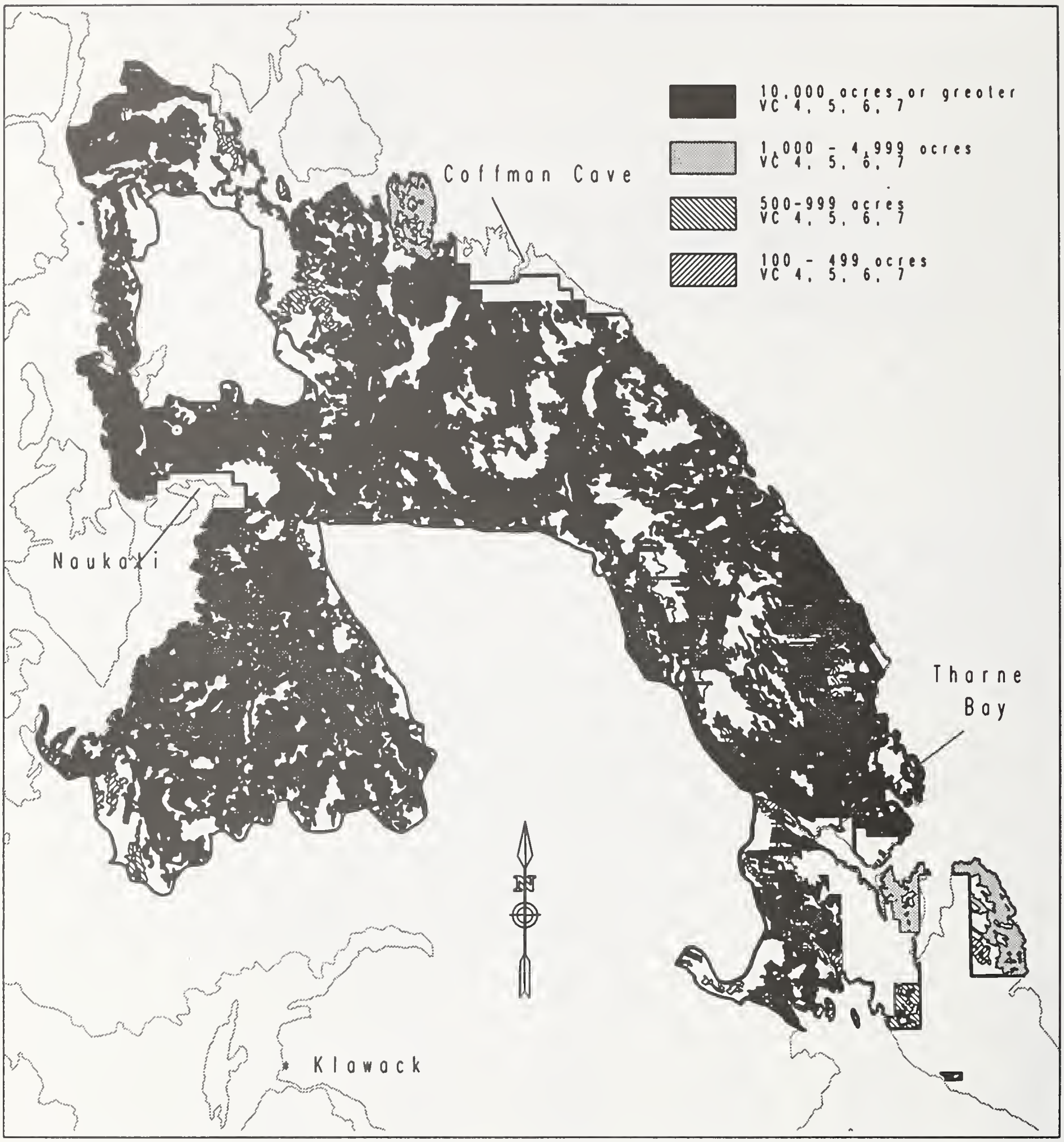


Figure 3-5
Patch Size Effectiveness, Alternatives 1 and 1a

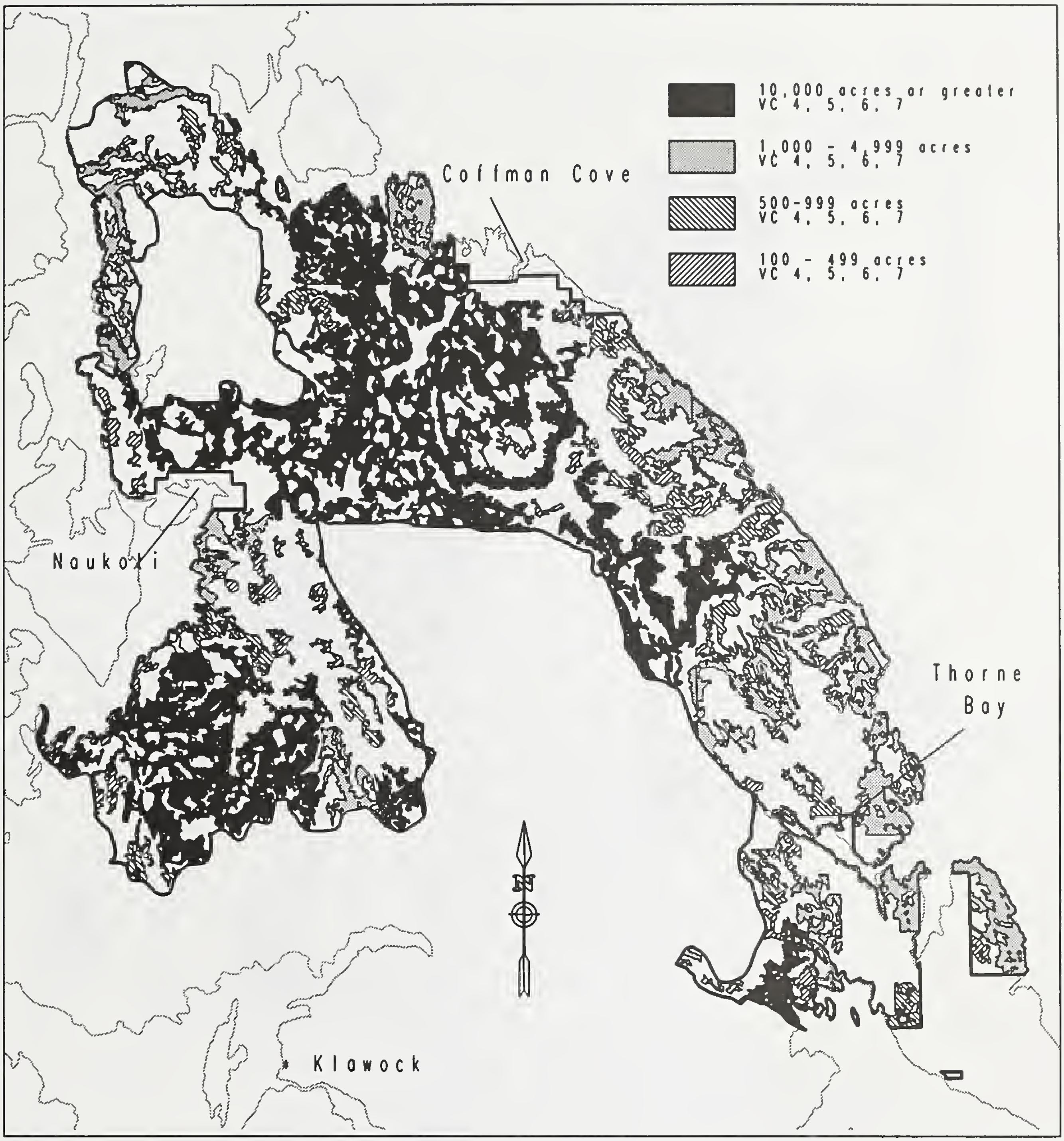
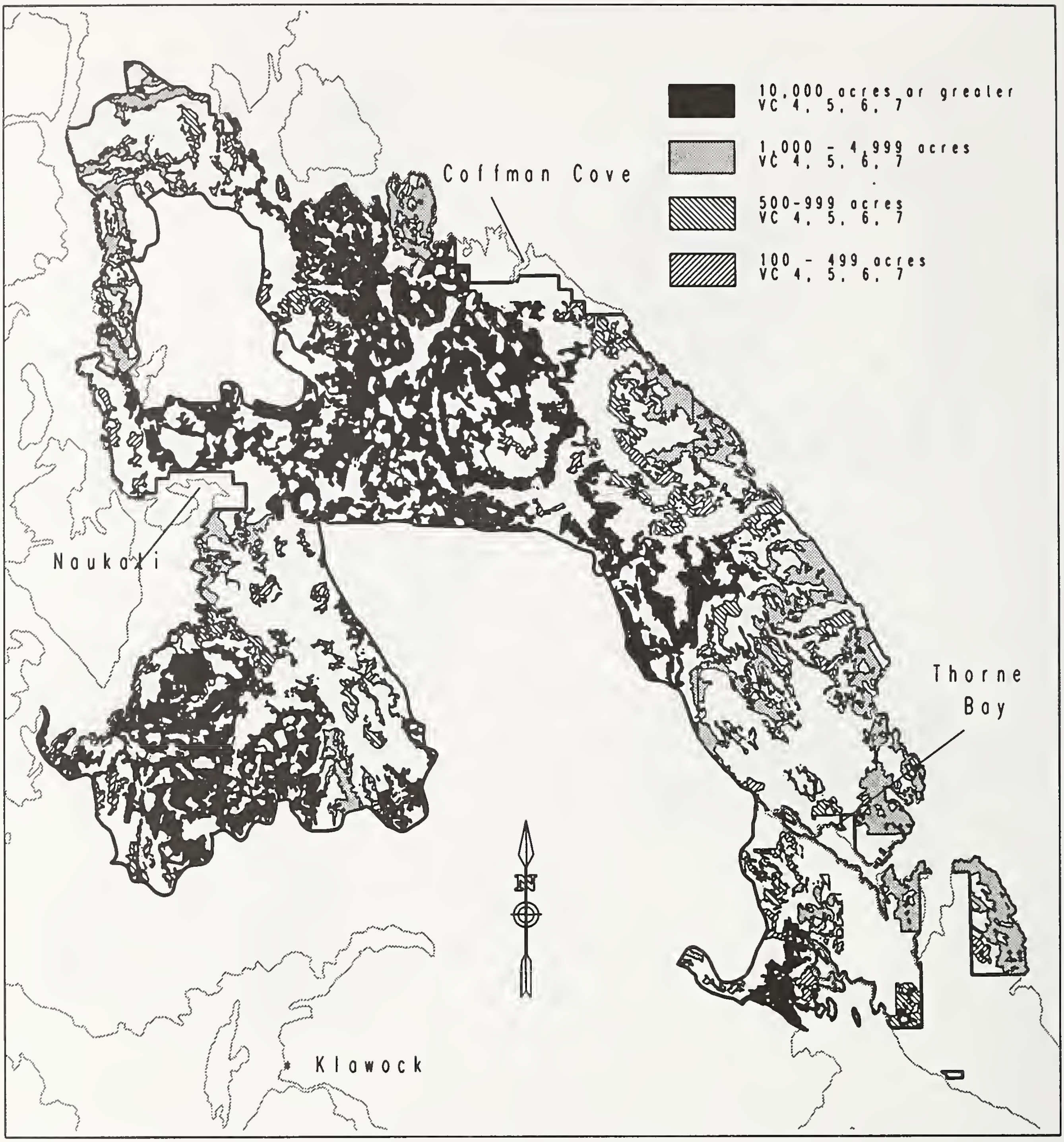


Figure 3-6
Patch Size Effectiveness, Alternative F5



Within the CPOW Project Area, concerns were expressed by the public about particular blocks of old-growth forest. Table 3-8 displays the harvest units by alternative which affect various blocks of existing old-growth forest.

Table 3-8
Timber Harvest Units in Old-growth Blocks by Alternative.

Old-Growth Block	Harvest Unit #	F2	F3	F4	F5	F6
Neck Lake	550-227		X			
Corridor	550-228		X	X		
	550-237		X			
	550-238	X	X			
Mabel Creek	553-221	X				
	553-222	X				
	553-228	X				
	553-232	X				
	553-233	X				
	553-235	X				
	553-236	X				X
	553-337	X				
Gold and	551-249		X			
Galligan	551-250		X			
Lagoon,	551-254		X			
to Whale	552-201		X			
Passage	552-202		X			
	552-203					X
	552-206		X			
	552-207		X			
	552-211		X			
	552-215		X			
	552-216		X			
	552-217		X			
	552-218		X			
	552-220		X			
	552-221		X			
	552-224		X			
	552-227		X			
	552-262		X			
	552-273		X			
	553-201		X			
	553-202		X			
	553-203		X			
	553-205		X			
	553-207		X			
	553-219		X			
	553-245		X			

continued

Table 3-8 continued

Old-Growth Block	Harvest Unit #	Alternatives F2	F3	F4	F5	F6
Barnes and Sweetwater Lakes Area	573-210		X			X
	573-264		X			X
	573-268		X			X
	573-289		X			X
	573-227		X			
	573-228		X			
	573-231		X			
	573-296		X			
	573-297		X			
	573-314		X			
	573-308					X
Hatchery Crk.	574-239					X
	574-238		X			
Baird Peak	581-241					X
	582-214	X	X		X	X
	582-215	X	X		X	X
	582-218	X		X	X	X
Staney Creek	571-274	X	X	X		X
	587.1-215	X	X	X	X	X
	589-271			X	X	X
	589-273			X	X	X
	589-274		X	X	X	X
	589-275		X	X	X	X
	589-262	X	X	X	X	X
Paul Young Creek	598-203		X	X		
	598-206		X	X		
	598-207		X	X		
	598-207B		X	X		

Old-growth forest in Southeast Alaska.

Effects of Alternatives on Existing Old-Growth Blocks

Neck Lake Corridor—This corridor is maintained in all alternatives, except Alternative F3. Alternative F3 will further reduce the effectiveness of this corridor that is in the narrowest portion connecting north and central Prince of Wales Island. Large portions of the corridor consists of recently harvested stands and extensive second-growth areas.

Sarkar/Barnes Lake—Alternative F2 reduces the size of this block by harvesting timber in the headwaters of the Mabel Creek drainage, which is a dispersal route from Sarkar Lakes. Alternative F3 proposes major timber harvest activity in the Barnes Lake, Gold and Galligan Lagoon, and Whale Passage areas. This alternative would significantly reduce the size of this old-growth block. Alternatives F4, F5, and F6 do not propose any harvest within this block.

Sweetwater Lake/Hatchery Creek—Alternatives F2, F4, and F5 do not propose any additional harvest in this area. Alternatives F3 and F6 propose scattered timber harvest of this area, which will slightly decrease the effectiveness of this area for dispersal from Honker Divide to the Barnes Lake area.

Baird Peak—All alternatives, except F3, propose harvest within this block, which will reduce the size of the large patch identified by the 1989-94 LTS EIS for retention. Connectivity to Honker Divide will still be maintained.

Paul Young Creek—Alternatives F2, F5 and F6 defer harvest in this area. Alternatives F3 and F4 make an initial entry into this area. This initial entry would increase the amount of clearcuts in the old-growth matrix. Connectivity between the Karta Wilderness and Honker Divide would still be maintained.

Staney Creek—All alternatives propose additional harvest in this area, which has already been heavily harvested. The most significant block of old growth in this area was identified by the 1989-94 LTS EIS for retention; this block includes harvest units 589-271, 589-273, 589-274, and 589-275. Only Alternative F2 avoids this block.

The Staney Creek area would receive some timber harvest under all CPOW action alternatives.

Snag Abundance Analysis

TLMP Draft Revision (1991a) standards and guidelines call for maintaining a minimum of 275 snags per 100 acres of forested habitat, for cavity nesting wildlife species. An analysis was completed for all VCU's within the Project Area to determine if prior harvest has reduced the number of snags below forest standards and guidelines.

This analysis was accomplished by using snag densities for the various timber types existing within the Project Area, as determined by Noble and Harrington (1977). In evaluations, the size and species of snags were accounted for. Areas that had been previously harvested were assumed to have no snags. The maximum number of snags per acre used was eight per acre; it was assumed that more than eight snags per acre would be in excess of nesting and courtship needs of the hairy woodpecker, which was the MIS chosen to represent cavity dwellers and users of snags for the CPOW Project Area. The analysis indicates that there is an adequate number of snags existing in all VCU's. However, some VCU's were identified as needing further analysis to confirm adequate distribution of snags.

Based on map and photo review, the following units will leave small patches of snags within the unit (while providing safe working conditions for timber workers), to maintain a good distribution of available snags:

550-230	579-222
557-201	579-223
557-202	583-227
579-212	585-215
579-213	587.1-208
579-214	588-327
	598-245

Comparison of Alternatives

Based on old-growth habitat and patch size effectiveness, Alternatives 1 and 1a would do the most to preserve the natural biological diversity of the Project Area and maintain natural ecosystem processes. Of the action alternatives, Alternatives F2, F4, and F5 maintain the most acreage in large, high volume old-growth blocks. There is not much difference among action alternatives when considering patch size effectiveness, although Alternative F2 is slightly better than F3 through F6. Alternative F2 does not call for any further fragmentation of either the large (Honker Divide) or medium (Staney Creek) HCA proposed to be retained for viable populations. Alternatives F4 and F5 do not propose any further fragmentation within the Honker Divide HCA, but do propose to harvest timber in the Staney Creek block.

THREATENED AND ENDANGERED SPECIES

Key Terms

Endangered - a species in danger of extinction throughout all or a significant portion of its range
Threatened - a species that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range
Category 2 Candidate - a species or group of species being considered by the U.S. Fish and Wildlife Service for listing as endangered or threatened, but for which conclusive data is lacking on its biological vulnerability and degree of threat
Category 3 Candidate - species that are now considered to be more abundant and/or widespread than previously thought
Sensitive - species whose population viability is of concern on national forests within the region, and which may need special management to prevent their being placed on State or Federal threatened and endangered species lists
Haul out - areas of large, smooth, exposed rocks used by seals and sea lions for resting and pupping

Affected Environment

Threatened or Endangered Species

Federally listed threatened and endangered species are those plant and animal species formally listed by the U.S. Fish and Wildlife Service (USFWS) or the National Marine Fisheries Service (NMFS), under the authority of the Endangered Species Act of 1973, as amended. Candidate species are those being considered for listing as threatened or endangered by the USFWS and NMFS. The State of Alaska has an Endangered Species Law which authorizes the commissioner of the Alaska Department of Fish and Game (ADF&G) to list Alaska endangered species. The Forest Service Regional Forester can designate species on National Forest System lands as "sensitive."

Fish

No threatened, endangered, or sensitive fish species are known to occur in the Central Prince of Wales Project Area.

Plants

No plant species known to occur in the Project Area have been determined to be threatened, endangered, or sensitive.

Other Wildlife

No endangered or threatened wildlife species are known to occur in the Project Area (Holmberg 1992). The endangered American peregrine falcon may migrate through the Prince of Wales Island area, as well as the Eskimo curlew and the Aleutian Canada goose (Holmberg 1992). The Peale's subspecies of the peregrine falcon nests on the Outer Islands west of the Project Area (Schempf 1981 and 1982). This species is not listed as endangered or threatened, but is covered by a provision of "similarity of appearance," which broadens the scope of the protection for all peregrine falcons. No harvest unit for any of the alternatives is within 20 miles of any known nest site of Peale's peregrine falcon.

Humpback whales and Steller sea lions are occasionally found in waters bordering the Project Area (Pennoyer 1992). There is a Steller sea lion haul out area located on the south tip of Grindall Island (at the south tip of Kasaan Peninsula). No developments are planned within 15 miles of this haul out site. A biological assessment has been prepared for peregrines, whales, and sea lions, and is found in Appendix B.

Sensitive Species

There are several species occurring within the CPOW Project Area which are classified as sensitive or as category 2 or 3 candidate species.

Prince of Wales Northern Flying Squirrel

Several subspecies of northern flying squirrel were listed as category 2 candidate species in the May 22, 1984 Federal Register (1984, cited in Amaral 1989). In a June 5, 1987, memorandum, the U.S. Fish and Wildlife Service (USFWS) recommended changing the Prince of Wales flying squirrel from a category 2 candidate species to a category 3 candidate species. According to the USFWS, the squirrel is known to be largely dependent on old-growth forest for both nesting and foraging habitat.

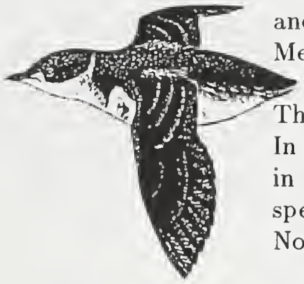
Old-growth habitat patches of 75–120 acres are needed to support at least one northern flying squirrel (Rosenberg and Raphael 1986); a 1,000-acre patch of old growth is assumed to provide habitat for 20–40 flying squirrels in Southeast Alaska.

Corridors of old-growth forest between habitat patches are needed to ensure that the genetic pool for the northern flying squirrel is adequate and to provide for safe movement out of the area as population pressures increase. Buffer zones of streams, lakes, and beach fringe serve well as travel corridors for flying squirrels, as do stringers of old-growth forest between habitat patches.

An Interagency Task Group evaluated the habitat requirements for flying squirrels and determined that habitat necessary to maintain viable populations would be available on Prince of Wales Island (Interagency Task Group meeting records, July 18, Sept. 1 and 8, 1988).

Marbled Murrelet

The marbled murrelet is a robin-sized seabird that is found throughout the North Pacific; the North American subspecies ranges from Alaska's Aleutian Islands to central and occasionally southern California. The marbled murrelet feeds in near-shore ocean feeding areas, inland salt waters, and occasionally inland freshwater lakes. The bird feeds below the water's surface on small fish and invertebrates.



Based on miles of shoreline having food resources and appropriate nesting area, Alaska is the major center of the marbled murrelet population in North America (Marshall 1988). Population estimates for Southeast Alaska range from 250,000 (Kessell and Gibson 1978, cited by Marshall 1988) to 75,000–150,000 (McAllister, cited in Mendenhall 1992).

The marbled murrelet is currently listed as a category 2 candidate species in Alaska. In 1992 the U.S. Fish and Wildlife Service listed the marbled murrelet as threatened in Washington, Oregon, and northern California; in Alaska it remains a candidate 2 species pending further research. The bird's only known nesting sites in the Pacific Northwest and Southeast Alaska are in old-growth forests.

Marbled murrelet habitat requirements are not well established for Southeast Alaska, and there is a need for research on both nesting and wintering habitat requirements. However, the available information indicates that habitat for regional marbled murrelet populations is probably adequate (see Appendix B).

Northern Goshawk

The goshawk is a raven-sized raptor associated with forests having tall trees and dense canopies. These features allow goshawks to hunt beneath the tree canopy, and to capture prey before the prey escapes into the trees or shrub layer. The dense canopy provides suitable micro-climate and predater protection at nest stands. Total foliage volume and trunk surface (i.e., large trees with dense canopies) foster more abundant prey populations. Goshawks forage over home ranges that are typically 6,000 to 8,000 acres, though home range may be twice that size in fragmented forests (Crocker-Bedford 1991).

The northern goshawk has been listed as a category 2 candidate species for all of its range, including the Queen Charlotte subspecies which is present in Southeast Alaska. The status review is expected to be completed sometime during 1993. On August 18, 1992, Interim Guidelines for Goshawk Habitat Management were adopted by the USDA Forest Service Region 10.

Guidelines for Northern Goshawk Management Areas consist of three components:

- *Nest Area* (NA)—includes the nest, nest tree, and approximately 30 forested acres surrounding the nest tree. Habitat management guidelines recommend no vegetation manipulation within the Nest Area and no prolonged mechanical activity within 600 feet of active NA's from March 15 to September 1.

- *Post Fledging Area* (PFA)—includes approximately 600 acres of contiguous forest around the nest area which have the potential to be habitat that is highly used by fledglings. Timber harvest can occur within this zone, but should be planned in less important habitat types, and openings resulting from timber harvest should not be greater than 20 acres in size and 600 feet in width.

- *Foraging Area* (FA)—includes approximately 6,000 acres around the NA that is used by young and adult goshawks to meet their food requirements. At least 20 percent of the FA should be in stands that provide important habitat structure (large trees with dense overhead canopy).

There are two areas within the CPOW Project Area where goshawk nests have been confirmed: The Sarheen Goshawk Management Area southwest of Neck Lake, and the

Sarkar Lake Goshawk Management Area near Salt Water Lagoon. Nest trees have been located for the Sarheen and Sarkar areas. Two adult and two juvenile birds in the Sarkar area have been fitted with radio tagged collars. These birds are being studied by biologists as part of a cooperative interagency agreement between the Forest Service and ADF&G to better understand the habitat requirements of goshawks in Southeast Alaska. Preliminary analysis indicates that this pair of goshawks selected mature forests of greater than 8,000 board feet per acre (greater than or equal to volume class 4) and avoided unforested habitat and forest stands of less than 8,000 board feet per acre; and may have much larger home ranges than goshawks in the lower 48 states (ADF&G 1993). Habitat composition of the Sarheen and Sarkar Lake management areas is presented in Table 3-9.

Table 3-9
Habitat Composition of CPOW Goshawk Management Areas, in Acres

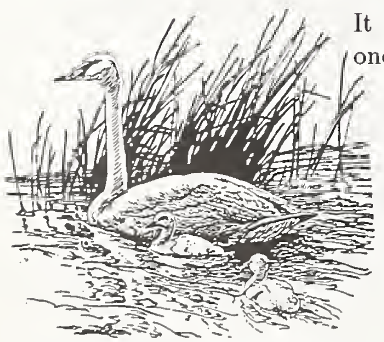
Territory	Size	Non-Forest	Low Productivity	Water	Clearcut	Volume Class 4+
Sarheen	7,632	159	2,657	189	1,353	3,274
Sarkar Lake*	3,867	20	164	54	1,927	1,702

* The SarkarLake Goshawk Management Area is analyzed only for the portion that is in the CPOW Project Area. The mapped Foraging Area includes parts of Tuxekan and El Capitan islands.

Trumpeter Swan

The trumpeter swan is the largest waterfowl species in the world. Its present range is only a vestige of the once vast region of North America that it frequented in both summer and winter (Bellrose 1980). Trumpeter swans breeding in Alaska spend the winter along the Pacific Coast from the Alaska Peninsula to the mouth of the Columbia River, where they take advantage of open waters of saltwater estuaries and freshwater lakes and rivers. Trumpeter swans are present in the Project Area primarily during the fall and early spring migration periods and during winter, normally from mid October to early April. The trumpeter swan is classified as a sensitive species in Forest Service Region 10.

Sweetwater and Barnes lakes are the two most heavily used swan wintering areas within the Project Area, with more than 100 birds being observed on several occasions. Other areas where swans have been seen include: Thorne River Flats, Ratz Harbor, Karta Lake, Control Lake, Hatchery Lake, Luck Lake, Honker Lake, Gold and Galligan Lagoon, Sarkar Lake, Staney Creek Meadow, and Big Salt Lake.



It is doubtful that swans normally nest in the Project Area, but an adult swan with one young was observed on Sarkar Lake 6/26/76.

Effects of the Alternatives

Threatened or Endangered Wildlife Species

Proposed actions in the CPOW Project Area in each of the alternatives are not anticipated to adversely affect directly, indirectly, or cumulatively the humpback whale, American peregrine falcon, Aleutian Canada goose, Steller sea lion, or Eskimo curlew. A biological assessment is included in Appendix B. The biological assessment determined, and the National Marine Fisheries Service (Pennoyer 1993) and U.S. Fish and Wildlife Service (Holmberg 1993) concurred, that the proposed project is not likely to affect these species.

Sensitive or Category 2 Candidate Species

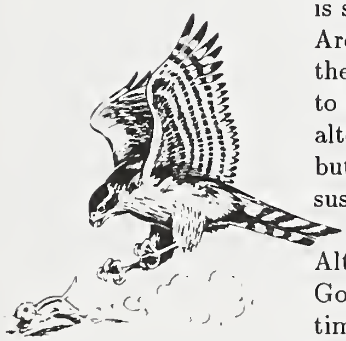
Marbled Murrelet

All action alternatives will harvest stands capable of providing nesting habitat (old-growth forests) for marbled murrelets. Table 3-46 in the Wildlife section of this chapter shows that Alternatives F2, F3, F4, F5 and F6 harvest seven percent of the remaining old-growth forest in the Project Area.

Based on current information, a reduction in available nesting habitat may occur. However, there appears to be adequate habitat available to maintain a viable population of marbled murrelets within the large unroaded blocks of habitat that exist in and adjacent to the Project Area.

Northern Goshawk

Alternatives 1 and 1a will not affect the productivity of any goshawk management area. The impact that the other alternatives will have is extremely difficult to predict since there is very limited information available with regard to the effects of timber harvest on goshawk productivity in Southeast Alaska. One way to predict an effect on goshawk productivity would be based on acres harvested, provided the territory is still active. None of the alternatives proposes any timber harvest within the Nest Area (NA) or the Post Fledging Area (PFA). Based on the amount of harvest within the suspected goshawk Foraging Area, Alternatives F3 and F4 would be most likely to affect productivity, and Alternative F2 would have the least impact of the action alternatives. Alternative F5 would have impacts somewhat less than F3 and F4, but more than Alternative F2. Table 3-10 presents acres of timber harvest within suspected goshawk foraging areas.



Alternatives 1, 1a, and F6 do not propose any timber harvest within the Sarkar Lake Goshawk Management Area. Alternatives F3, F4, and F5 all propose 147 acres of timber harvest within this goshawk Management Area, which is approximately 10 percent of the remaining old-growth forest (volume class 4+). In Alternative F5, the acres will all be partial cut, with the objective of maintaining suitable goshawk habitat incorporated into the silvicultural prescription. This timber harvest when combined with the amount of harvest that has already occurred (1,927 acres), may have an effect on the productivity of this area. Alternative F2 proposes to harvest 83 acres within the Sarkar Goshawk Management Area.

Alternatives 1, 1a, and F2 does not propose timber harvest within the Sarheen Goshawk Management Area. Alternatives F3, F4, and F5 will harvest approximately 10 percent of the remaining high volume, old-growth habitat in the Foraging Area (Table 3-10). In Alternative F5, 98 of these acres (55 percent) will be partial cut,

with the objective of maintaining suitable goshawk habitat incorporated into the silvicultural prescription. This harvest, when combined with the amount of harvest that has already occurred (1,353 acres), may have an effect on the productivity of this area. Alternative F6 would have a lesser possibility of affecting nest productivity than F3 through F5.

Table 3-10
Acres of timber Harvest Within Suspected Goshawk Foraging Areas

			Alternatives				
Foraging Area	1	1a	F2	F3	F4	F5	F6
Sarheen	0	0	0	270	199	177*	119
Sarkar Lake	0	0	83	147	147	147**	0
Total Harvest	0	0	83	417	346	324	119

* 98 acres (55%) will be partial cut to maintain habitat.
** 147 acres (100%) will be partial cut to maintain habitat.

Nest areas will be protected from harvest in all alternatives, following the recently issued Interim Guidelines for Goshawk Management (USDA Forest Service 1992c). While the habitat requirements of goshawks in Southeast Alaska are not well documented, numerous studies have observed that timber harvest can adversely affect goshawks (numerous authors cited in Marshall 1992). The Interim Guidelines for Goshawk Habitat Management will be incorporated into unit layout and design.

Trumpeter Swan

Timber harvest activity will not be in conflict with TLMP Draft Revision (1991a) standards and guidelines for trumpeter swans, since swans are not present in the Project Area when most of the timber harvest activity occurs. There is a potential for conflict when swans are migrating through the area or returning to wintering areas on Barnes Lake, Gold and Galligan Lagoon, and Sweetwater Lake. Noise from road construction, timber harvest, and hauling of logs could frighten swans away from their preferred resting and feeding areas. However, limiting road construction and timber harvest operations to periods when swans are not present will mitigate these potential impacts for the road segments and units that are within a half mile of Barnes Lake, Gold and Galligan Lagoon, and Sweetwater Lake (see Mitigation Measures, Chapter 2).

Alternatives 1, 1a, F2, F4, and F5 do not propose any units for harvest within a half mile of Barnes or Sweetwater lakes. Alternative F3 has 7 harvest units within a half mile, and Alternative F6 has 4 units within a half mile of Barnes Lake, Gold and Galligan Lagoon, and Sweetwater Lake.

FOREST PESTS & DISEASES

Key Terms

Endemic - peculiar to a particular locality; indigenous
Epidemic - rapid spread or sudden prevalence of a disease
Phloem - the tissue in plants that conducts foods such as sugar
Xylem - the tissue in plants that conducts water and substances in solution
Sapwood - the softer part of wood, between the inner bark and the heartwood

Affected Environment

Forest insects and diseases are normal components of the forested sites in the CPOW Project Area. Some of them exist, and will continue to exist, at endemic levels. Even at low levels of infestation or infection, forest insects and diseases have considerable effects on forest dynamics and resource management values. When they proliferate and become epidemic, the consequences to the forest can be dramatic. Currently there is no indication that insects or diseases are a potential problem in the CPOW Project Area.

Insects

The two most common types of destructive insects found in the CPOW Project Area are defoliators and bark beetles.

Forest Defoliators

Forest defoliators eat the leaves or needles of forest trees. Unlike bark beetles, defoliators usually do not kill trees but slow down tree growth and increase susceptibility to secondary attack by other insects and diseases. All species of trees are not equally susceptible to injury from defoliation. Hardwood species can usually withstand several years of defoliation because they store large food supplies and can refoliate in the same year. Conifers, on the other hand, may be killed by a single defoliation if it occurs prior to bud formation in midsummer.

The two most common forest defoliating insects that occur within the Project Area at endemic levels include the following.

BLACK-HEADED BUDWORM, *Acleris gloverana* (Wals) is one of the most destructive forest insects in coastal Southeast Alaska. In the 1950's, almost one-third of the net timber volume was lost on some hemlock sites due to budworm defoliation. Larvae usually confine their feeding to new growth. In large concentrations, the larger larvae will feed on older needles. Budworm defoliation can result in growth reduction, top-kill, and, at times, tree mortality. Budworm populations are characterized by sporadic spectacular increases followed two to three years later by equally rapid declines.

HEMLOCK SAWFLY, *Neodiprion tsugae* (Middleton) is a serious defoliator of western hemlock throughout Southeast Alaska. Outbreaks tend to be more severe and of longer duration in the area south of Frederick Sound, especially along Clarence Strait. Larvae feed on mature foliage rather than the current year's foliage. Most sawfly outbreaks do not cause tree mortality, but some trees are top-killed and radial growth may be reduced. Tree mortality becomes more likely when sawfly and black-headed budworm populations coincide. This is due to the feeding habits of the two defoliators; the budworm feeds on the current year's foliage, whereas sawflies consume previous years' foliage. Natural controls usually reduce epidemic sawfly populations within a few years. Wetter than normal summers help reduce sawfly populations by favoring conditions for fungal growth. Fungi readily infect and kill sawfly larvae under warm, damp conditions. Low summer temperatures can also delay sawfly development and reduce the opportunities for successful egg laying. Eventually starvation and poor nutrition brought about by depletion of the host foliage will also contribute to the population collapse.

Bark Beetles


Bark beetle

Bark beetles are probably the most destructive forest insect in Alaska. Bark beetles prefer to breed in weakened host material. However, during favorable climatic periods for beetle development, populations may build up rapidly and healthy trees are successfully attacked. Bark beetles girdle the phloem which, in turn, disrupts the downward movement of nutrients. Some bark beetles, notably those of the genus *Dendroctonus*, have a symbiotic relationship with blue-stain fungi. The blue-stain fungi can completely penetrate the sapwood within a year. The fungi plug up the outer conducting tissues in the xylem which halts upward water movement. This action, plus that of the bark beetles, causes the death of a host tree.

SPRUCE BEETLE, *Dendroctonus rufipennis* (Kirby) outbreaks have been noted across the Tongass National Forest and adjacent lands in previous years. The spruce beetle life cycle is two years, with adult beetles emerging in late May to early June in search of susceptible host material (spruce logs). Dispersing adults can fly for long distances, over seven miles nonstop. Adult mortality during dispersal is quite high. Female beetles are attracted to windthrow and other downed material. Beetles prefer to attack the sides and bottoms of downed material because of favorable temperature and moisture regimes for brood development. Males are attracted to the site via airborne chemicals produced by the female beetles.

Most outbreaks originate in blowdown or logging residuals (cull logs) and spead to adjacent standing timber. Mortality in unmanaged Sitka spruce stands varies and can be as high as 75 percent.

Diseases

Some of the more common diseases and other forms of damage are discussed below.

HEMLOCK DWARF-MISTLETOE, *Arceuthobium tsugense* (Rosendhal, G.N. Jones) is a destructive disease of western hemlock throughout the Project Area. Infestation levels vary in old-growth hemlock stands. Dwarf-mistletoe is absent in some stands, and in other stands almost every hemlock is infected. The volume of western hemlock trees heavily infected with dwarf-mistletoe can be reduced as much as 50 percent over a 100 year period. Dwarf-mistletoe is species specific and rarely infects Sitka spruce and mountain hemlock.

The spread of dwarf-mistletoe in young hemlock stands is often the result of leaving standing infected hemlock in cutover areas (TLMP Draft Revision). Dwarf-mistletoe responds to light with increased seed production. Rates of spread to adjacent and lower canopy trees will increase in partial cuts where infected hemlocks remain.

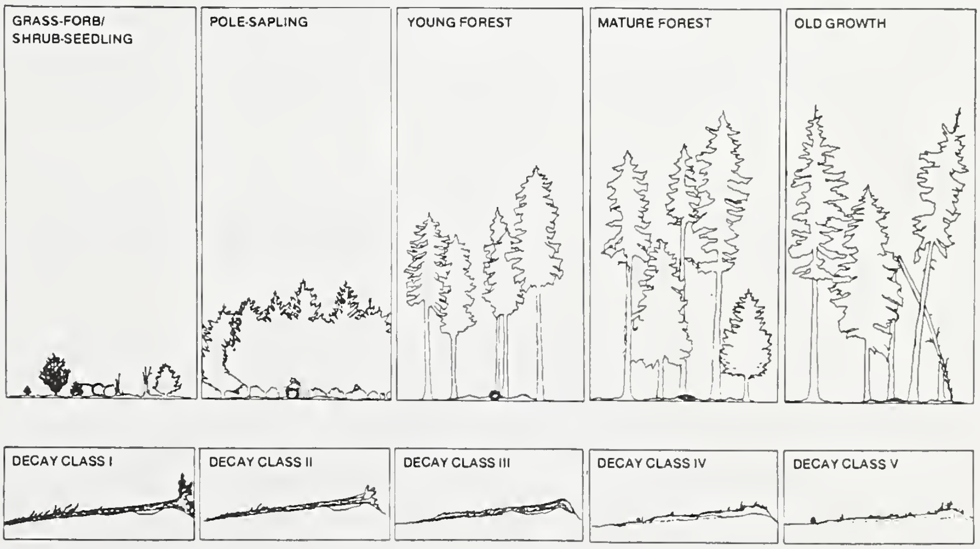
ALASKA YELLOWCEDAR DECLINE, which leads to reduced growth and eventual death of Alaska yellowcedar, is a widespread problem throughout the Project Area. This decline is associated with wet, poorly drained sites, and recent research has demonstrated that the primary cause of decline cannot be attributed to any contagious organism (TLMP Draft Revision). Since it is not contagious, Alaska yellowcedar decline will not spread to sites where it is not found now (TLMP Draft Revision, pp. 3-117). Because Alaska yellowcedar has high timber value, this annual mortality represents a significant loss in timber value. In addition, substantial acres of old-growth cedar forests have been harvested and are regenerating to other species. The regeneration of Alaska yellowcedar needs to be specifically considered, where it forms a significant component of a site proposed for harvest.

Other

HEMLOCK FLUTING results in deeply incised grooves and ridges that extend vertically along the trunk of the tree. This condition reduces the value of hemlock logs because they yield less sawlog volume and because some of the milled wood contains bark. The cause of hemlock fluting is not completely known, but is believed to be genetically controlled. Some sites are heavily affected, to the point of making the stand unsaleable, while other sites have relatively light or no damage.

DECAYS that affect the stem and root systems are probably the major cause of volume loss within the Project Area. Many decay fungi enter through tree wounds. The accidental wounding of trees during partial cuts and commercial thinnings will increase the impact from decay organisms in managed stands.

Trees are susceptible to a sequence of diseases at different stages of their growth. Early susceptibility thins a forest stand resulting in more vigorous crop trees. In turn, late susceptibilty removes the older and more decadent trees, making room and preparing the way for new trees.



Trees are susceptible to a sequence of diseases at different stages of their growth.

Effects of the Alternatives

Specific pests will be affected differently by each of the alternatives. In general, increasing timber harvest will decrease the impacts of the spruce beetle and timber volume loss by pests such as wood decay fungi and hemlock dwarf mistletoe. From the perspective of timber management, the health of the forest is increased through timber harvesting. However, many of these pests also contribute significantly to ecosystem diversity and long-term stability in old-growth stands by providing increased canopy diversity and animal habitat, and by causing the formation of small scale gaps.

In general, endemic levels of insect and disease activity in mature and overmature forests will be allowed to run their course. Tree losses will be accepted. Salvage logging that exceeds the intent of "minor changes" as defined under the timber sale contract and or direct control measures will require additional NEPA analysis prior to implementation. The action alternatives all have the same relative environmental consequences from a pest management standpoint regardless of whether viewed from a timber production or a biodiversity perspective.

The previous statement is true as long as the range of silvicultural systems applied remains constant across all alternatives. Partial cuts that retain overstory trees will result in western hemlock (the most tolerant species) forming a much larger percentage of the future stand composition. Sitka Spruce, western redcedar, and Alaska yellowcedar occurrence in these sites would be greatly reduced. Partial cutting would increase dwarf-mistletoe infection. Unless a large investment were made to sanitize the stand (remove infected trees) periodically, the future value of the site for timber production could be reduced or even eliminated from an economic standpoint.

GEOLOGY AND MINERALS

Key Terms

Aggregate - sand, gravel, or crushed rock, used for concrete or for road surfacing
Breccia - a rock composed of angular fragments of older rocks cemented together
Carbonate rock - rocks such as limestone and dolomite which contain a high content of calcium carbonate, CaCO3
Conglomerate - a rock composed of rounded fragments of older rocks cemented together
Dike - a long, narrow, crosscutting mass of igneous or eruptive rock intruded into a fissure of older rock
Drumlin - a long, narrow or oval, smothly rounded hill of unstratified glacial rock
Facies - the characteristics of a rock unit which reflect its origin and its relation to adjacent and associated units
Fault - a break in the continuity of a body of rock or of a vein, with dislocation along the plane of fracture
Igneous rock - rock formed by the cooling and consolidation of magma (lava)
Locatable mineral- any mineral that is valuable in the usual economic sense or has a property that gives it distinct and special value
Metamorphic rock - rock whose original compounds, textures, or both have been transformed to new compounds or textures as a result of high pressure, temperature, or both
Sedimentary rock - rock formed by chemical precipitation or sedimentation of mineral grains deposited by water, wind, or ice
Skarn - mineralization formed by contact metamorphism of carbonate rock

Introduction

The geology of the CPOW Project Area influences all physical and biological characteristics. The geological characteristics are described by the geomorphology, geology, minerals, and karst and cave resources of the Project Area. The karst and cave resources will be discussed in a separate chapter dealing solely with those resources.

Affected Environment

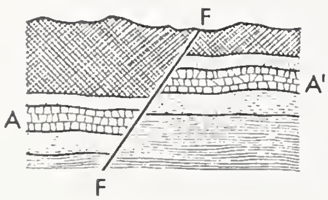
Geomorphology

The CPOW Project Area is characterized by glacially modified wide valleys, rounded mountains, and hills of low to moderate relief with elevations reaching 3,000 feet. Generally the mountains and ridges are aligned along northwest-southeast trending faults. These faults have been widened by glaciation and subsequent erosion into steep-sided valleys which separate the ridges and mountains. A major deep-seated fault bisects the area from Kasaan Bay, up the Thorne River valley, down Hatchery Creek, forming the southwestern end of Sweetwater Lake, and entering Whale Passage

along Mabel Creek. The valleys associated with this fault have been heavily glaciated, as indicated by the drumlin field within the Thorne River Valley; the steep sided, rounded valleys of the North Thorne River tributaries; and the Luck Lake drainage. Estuaries of Kasaan Bay, Thorne Bay, Naukati Bay, Staney Creek, and the Sweetwater Lake system have resulted in part from uplift after de-glaciation. Raised marine beaches can be found in many of these areas.

Geology

The geology of the Project Area has been mapped through field reconnaissance, on a 1:250,000 scale. Brew, Overshine, Karl, and Hunt (1984) published a preliminary map of the Petersburg quadrangle which includes that portion of Prince of Wales Island north of a line extending west from Coffman Cove and bisecting Kosciusko Island. A geologic description for the remainder of the Project Area is included in a report by Eberlein and Churkin (1983) for the Craig quadrangle. Additional geologic mapping was conducted in conjunction with survey of the karst resources conducted by the Karst Resource Group in 1992 (see Karst and Cave Resources section of this chapter).



Fault (def.5)
Section of strata displaced by a fault; A and A′, formerly continuous mass of rock; F, Fault line

The dominant rocktypes present in the Project Area are volcanic breccias and conglomerates of Silurian and Ordovician age (including breccia of Luck Creek); Silurian to Ordovician sedimentary and volcanic rocks; carbonate rocks of Silurian age and younger Paleozoic sedimentary rocks; and intrusive igneous rocks of Paleozoic to Meozoic age with associated metamorphism and Quaternary surficial deposits.

Major structural features in this area include northwest-southeast trending faults. Folding, faulting, and fracturing of the bedrock is widespread. Intrusion by volcanic rocks has resulted in metamorphism of associated strata, mineralization, and, locally, limestone's recrystallization to marble.

Minerals

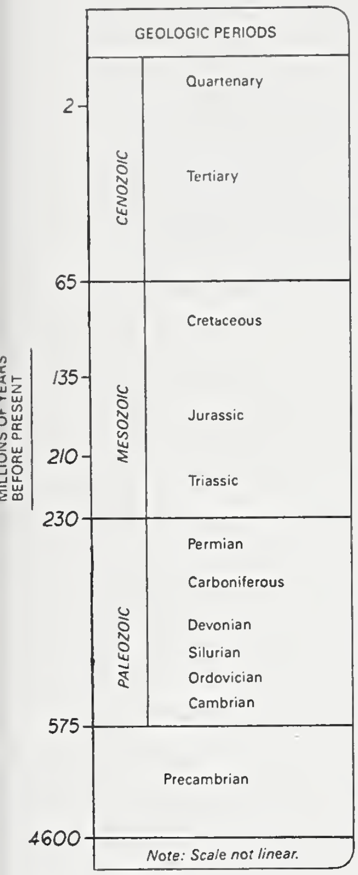
Other than within VCU 598, very little mineralization has been documented within the Project Area. The major copper-iron deposits located on the Kasaan Peninsula are skarn deposits which formed when alkalic dike swarms were thrust into limestone and calcareous sedimentary rocks. Other copper deposits formed in shear-related environments hosted in greenschist facies volcanic and sedimentary rocks. Chemical grade limestone deposits may exist in the northwestern corner of the Project Area (U.S. Bureau of Mines 1992). Though the copper is the main mineral, minor amounts of gold, silver, lead, and zinc have been reported. Minerals are considered below in three groups: locatable, leasable, and saleable.

Locatable Minerals

A locatable mineral is any mineral that is valuable in the usual economic sense or has a property that gives it distinct and special value. Five mineral occurrences are reported from within the Project Area (U.S. Bureau of Mines 1992).

The McCullough or Lake Bay Mine is located southwest of Coffman Cove. This copper deposit was located and developed in 1903. Ore was shipped in 1905-06 and it supposedly contained five percent copper. Minor assessment work was performed intermittently until 1930.

The Luck Lake occurrence was sampled by the U.S. Geological Survey (USGS) field crews in 1991 (U.S. Bureau of Mines 1992 for a summary of results). This represents a small copper deposit located within greenstone breccia.



Within VCU 598, three mineral occurrences have been mapped: the Rush Peak, Loon Lake Pit, and the Rush and Brown Mine.

Rush Peak and Loon Lake Pit were sampled by the USGS field crews in 1991 (U.S. Bureau of Mines 1992 for a summary of results). These occurrences show copper mineralization.

The Rush and Brown Mine was discovered in 1900 by U.S. Rush and George E. Brown. This mine was a consistent producer of copper ore through 1923, with shipments being sent to smelters at Tyee and Anyox, British Columbia, as well as one shipment to the Coppermount Smelter in 1905. The mine operated on a shoestring budget with a low initial investment, and survived price fluctuations that other operations could not endure. However, the inability to secure a long-term smelting contract was cited as a principal cause for the mine's demise. Solar Development Co. took an option on the property in 1929, and performed exploration work including sampling and drilling. The Bureau of Mines drilled four holes into the deposit in 1943, but these did not intersect ore.

U. S. Geological Survey (1991) summarized the potential for yet undiscovered locatable minerals within the Project Area.

The high degree of karst development within the northwestern corner of the Project Area suggests that chemical grade limestone ($CaCO_3$ >95 percent) may be present. See the Karst and Cave Resources section of this chapter for further discussion.

Leasable Minerals

Federally owned leasable minerals include oil, gas, coal, geothermal resources, potassium, phosphates, and sulfur. There are no known sites with potential for energy mineral development within or near the Project Area. No potentially usable geothermal areas are known to exist within the Project Area.

Saleable Minerals

Saleable or common variety minerals include sand, rock, building stone, gravel, and similar minerals. While no aggregate sources for general commercial utilization have been mapped within the Project Area, potential exists for aggregate resource development. Aggregate has been used extensively for road construction. To date most of this aggregate has been obtained through blasting bedrock and limited crushing. With expanding communities on Prince of Wales Island, the need for aggregate for construction and road building will increase. Currently all concrete aggregate is barged to the island from Ketchikan or Wrangell. The glacial outwash deposits of the Thorne River valley may contain washed gravels and sands. Limited deposits of these commodities are known. Building stone is also an untapped resource.

Direct, Indirect, and Cumulative Effects

No current mining operations are expected to be affected by the proposed action or any of the action alternatives. In general, the project would affect mining activities by providing easier access for mapping and surveying because of road construction and access to less developed or undeveloped areas. Geologic mapping would also be enhanced by increased exposure due to timber harvest and road construction. Increased access and road construction could also make available common variety minerals such as sand, gravel, and building stone.

SOILS

Key Terms

Alluvium - sand, gravel, and fine material made by a stream
Bedload - sand, silt, and gravel, or soil and rock debris rolled along the bottom of a stream by the moving water
Debris avalanche - the sudden movement downslope of the soil mantle; occurs on steep slopes and is caused by the complete saturation of the soil from prolonged heavy rains
Debris torrent - landslides that occur as a result of debris; avalanche materials which either dam a channel temporarily or accumulate behind temporary obstructions such as logs and forest debris
Duff - vegetative material covering the mineral soils in forests, including the fresh litter and decomposed organic material
Fines - minute particles of soil
Karst - a type of topography that develops in areas underlain by soluble rocks, primarily limestone
Mass movement/wasting - general term for a variety of processes by which large masses of earth material are moved by gravity either slowly or quickly from one place to another
Mass Movement Index (MMI) - rating used to group soil map units that have similar properties with respect to the stability of natural slopes
Riparian area - the area including a stream channel, lake or estuary bed, the water itself, and the plants that grow in the water and on the land next to the water
Sediment - solid materials, in suspension or transported by water, gravity, ice, or air
Slip plane - closely spaced surfaces along which differential movement takes place in rock
Soil productivity - capacity of a soil to produce plant growth, due to the soil's inherent chemical, physical, and biological properties
Till - gravel, boulders, sand, and finer materials transported and deposited by a glacier
V-Notch - a shallow to deeply cut stream drainage, generally in steep, mountainous terrain; would look like a "V" from a frontal view
Wetlands - areas that are inundated by surface or ground water with a frequency sufficient, under normal circustances, to support vegetation that requires saturated or seasonally saturated soil conditions for growth and reproduction
Windthrow - areas where trees are uprooted, blown down, or broken off by storm winds

Affected Environment

Introduction

Soils on Prince of Wales Island (POW) are found on a variety of terrains shaped by glaciation and characterized by U-shaped valleys with mountains extending 2,000 to 3,000 feet above sea level. Glacial till of variable thickness occurs in the valley bottoms and up to 1,500 feet on the sideslopes. Many of the valleys have numerous rocky knobs scoured by glaciation.

Soil development in Southeast Alaska is influenced by high levels of rainfall, cool maritime temperatures, and moderately low yearly soil temperatures. Under these conditions, organic matter decomposes slowly, resulting in a thick layer of organic duff. This surface organic layer is generally nutrient-rich. The subsurface mineral soil below the organic layer is generally nutrient-poor, because high amounts of rainfall leach nutrients from the soil. High rainfall also can lead to erosion of mineral soils if they are not protected by an organic duff layer. In general, the characteristics of the parent material, topography, vegetation, and climate influence the features of soils that affect and are affected by timber harvest activities. Soils influence the overall vegetation composition, water quality, riparian area and wetland functions and values, and productivity of timber, fish, and wildlife in the CPOW Project Area.

A soil inventory which identifies the soil types, their distribution and extent, has been completed on the CPOW Project Area (Soil Survey for the Ketchikan Area, USDA Forest Service, unpublished.). Soil descriptions and pertinent soil references are available in the Ketchikan Area Supervisor's Office. Soil references include: the current Tongass Land Management Plan (TLMP 1979a, as amended) Chapters 2 and 5; the Forest Ecosystems of Southeast Alaska (Swanston 1974); the Southeast Area Guide (USDA Forest Service 1977); the Alaska Regional Guide (USDA Forest Service 1983); anda soil inventory maps and associated soil series and map unit descriptions.

Soil Groups

Soils within the CPOW Project Area can be grouped by typical properties that influence the use and management of an area. Five soil types are important in the Project Area: (1) mineral soils, composed mainly of sand, silt, clay, gravel and rocks, (2) organic soils, composed of partially decomposed plant tissues; (3) soils formed over compact till; (4) riparian soils, made up of alluvial sand, silt and gravel; and, of special management concern, (5) the McGilvery soil series. This latter soil is composed of a thin layer of organic material overlaying bedrock. Figure 3-7 illustrates relevant characteristics of mineral, organic, till, and riparian soil types.

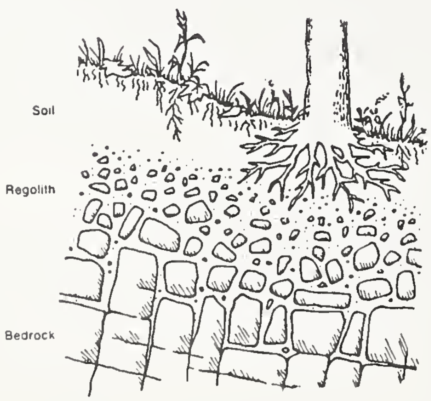
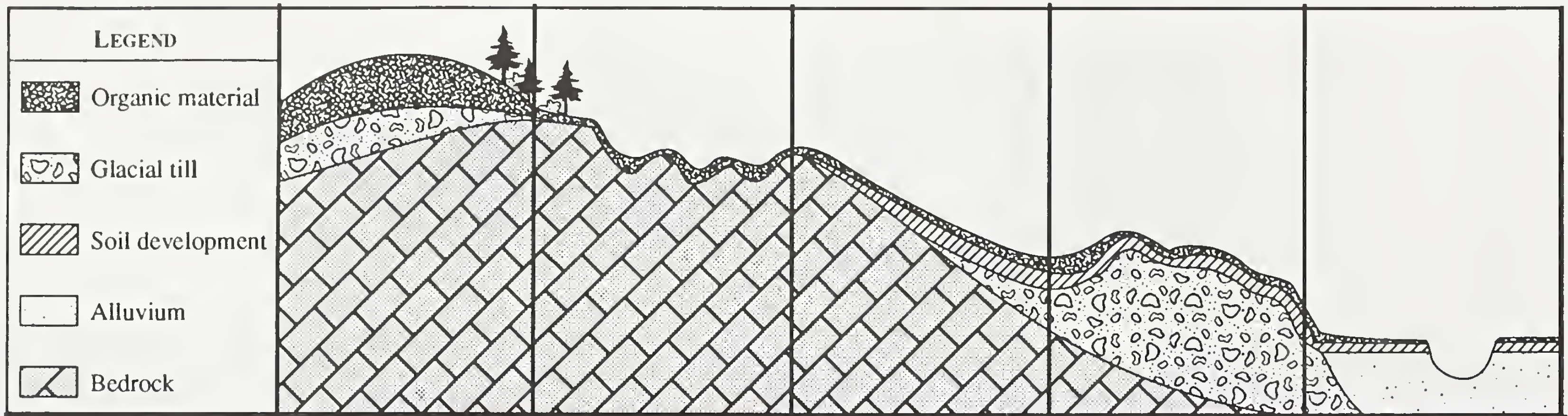


Figure 3-7
Soil characteristics



	Organic	McGilvery	Mineral	Till	Riparian
Description	Thick layer, partly to decomposed plant materials	Forest litter and partly decomposed plant material over bedrock	Shallow to deep soils developing in residuum or colluvium	Thin surface, soils developing in glacial till	Shallow to deep soils of stratified sand and gravel
Texture	Mucky peat	Peat	Sandy loam to silt loam	Sandy loam to silt loam	Sand and gravel
Soil Depth	7" to > 6'	< 8"	1' to > 6'	< 20" to < 6'	> 6'
Drainage	Poorly and very poorly drained	Well drained	Well to poorly drained	Well to poorly drained	Well to moderately well drained
Major Forest Types	Nonforest and varied forest types	Western hemlock	Western hemlock, mixed conifer	Western hemlock, Western hemlock/yellowcedar	Sitka spruce
Landform	Ridgetops, benches, depressions, valley floor	Upper backslopes of hills and mountains	Valley floors, hillslopes, mountain sideslopes, ridgeslopes	Moraines, drumlins, and valley floor deposits	Floodplains, stream terraces
Mass Movement Index Class	Generally low	Low	Low to very high	Low to very high	Low
Timber site Productivity Class	Low to moderate	Medium to high	Medium to high	Medium to high	High
Wetland Habitat Potential	High	Low	Medium	Medium	Very high
Upland Habitat Potential	Low	Medium	High	High	Very high
Acres & Percent of Project Area	129,345 acres 40 percent	26,852 acres 8 percent	186,198 acres 58 percent	93,154 acres 29 percent	6,045 acres 2 percent

Soil Properties

Long-term Soil Productivity

Soil and its productivity are critical elements, since they also affect the productivity of most other forest resources. Tree growth and wildlife and fish habitat are often associated with soil productivity (the soil component of long-term site productivity), which is the inherent capacity of a soil to support the growth of specific plants or plant communities (FSM 2554.03). In the Project Area, productivity of mineral soils (in terms of tree growth) ranges from very high on floodplains, till plains and most other lowlands, to medium to high on moderately well to well drained soils, to lowest on somewhat to very poorly drained soils. Productivity (in terms of tree growth) on poorly and very poorly drained organic soils, regardless of elevation or northern extent, is generally much lower than the productivity of mineral soils.

Generalized sketch of soil layers and vegetation cover.

Soil productivity can be predicted reasonably well from soil type characteristics. Soil drainage, coarse fragment content, soil organic matter and soil depth are responsible for the greatest difference in forest productivity in Southeast Alaska and relate most directly to timber growth, according to a number of studies (Stevens, Gass and Billings 1968; Ford, Farr and Ping 1988).

Soil organic matter content influences the physical and chemical properties of soils and accounts for at least half of the soil's nutrient pool. It also supplies energy and food for the microorganisms which are responsible for many biochemical changes as decay takes place. Organic matter is the product of three major factors: 1) vegetation cover, 2) climate, and 3) soil organisms.

Vegetation Cover. The original source of the soil organic matter is plant tissue. Under natural conditions, the tops and roots of trees, shrubs, grasses, mosses and other native plants annually supply large quantities of organic residues. Approximately 40 percent of the soils found within the Project Area are composed almost entirely of organic matter.

Climate. Climatic conditions, especially temperature and rainfall, exert a dominant influence on the amount of organic matter found in soils. In general, decomposition of organic matter is slowed in cooler climates; organic matter also increases as the effective moisture becomes greater (Brady 1974). Thus the low mean annual temperatures of Southeast Alaska combined with high amounts of rainfall yield an overall high amount of organic matter.

Soil Organisms. Decomposition of both plant residues and soil organic matter is a process of decay, as the plant residues are digested by microorganisms. The specific flora and fauna inhabiting soils depend on many factors, including climate, vegetation, soil temperature, acidity, and soil moisture (Brady 1974). In general, the forests of Southeast Alaska and the Project Area have a high diversity of soil fauna, but these organisms are not very active due to low temperatures. Thus, again, we have slow decomposition and high accumulation of organic matter.

Because of the importance of organic matter on forest productivity, maintaining the surface litter and organically enriched topsoil layers is critical for maintaining long-term site productivity. Soil productivity and its related nutrient content can be influenced in a number of ways by timber management activities. Removal of the surface layer may be caused by landslides, surface erosion, severe yarding disturbance, or from displacement by roads, skid trails, landings or rock pits. Soils can also be damaged by puddling, which impairs soil porosity and drainage, and therefore reduces productivity. Changes in soil productivity that last beyond the planning period

are considered to be significant impairments. Fifteen percent reduction in inherent soil productivity potential will be used as a basis for setting values for change in measurable or observable soil properties associated with long-term productivity (FSM 2554.03).

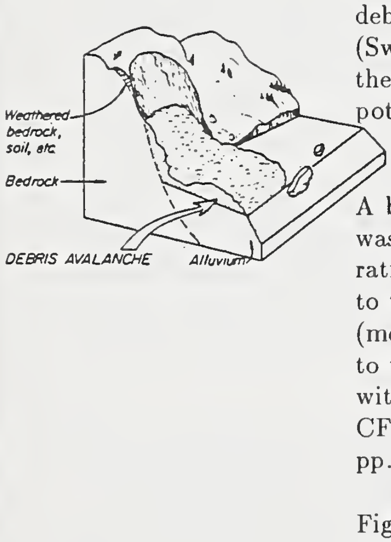
Soil Erosion

Two major types of erosion occur within the Project Area: (1) surface erosion, and (2) landslides.

Surface Erosion. Most undisturbed soils in the CPOW Project Area are resistant to surface erosion because they are generally protected by the surface layers of duff and the roots of vegetation. However, when mineral soils are exposed, gravity and running water can cause natural erosion. The rate of erosion depends primarily on the amount of vegetation ground cover and the steepness of slope. Locations where surface erosion and mass wasting are most likely are along stream banks, snowslide or avalanche slopes, and within V-notches. Timber harvest activities and road construction may increase the erosion rate by exposing mineral soil.

Landslides. Landslides are the dominant process of natural erosion in Southeast Alaska. Many landslides occur during or immediately after periods of heavy rainfall when soils are saturated. Landslides usually occur on steep slopes that have soils with distinct subsurface "slip" layers (slip-planes), such as compacted glacial till or bedrock that slopes parallel to the ground surface. These areas have a high likelihood of landslides, especially if disturbed by blasting rock or road pioneering, side casting of excavated material, or logging practices that cause substantial surface disturbance.

Vegetation, particularly tree roots, seems to have a stabilizing effect on slopes, but tree roots tend to significantly decrease in strength five to seven years after a tree is cut (Swantson 1989). This decrease in soil holding capacity results in an increased likelihood of soil movement on steep slopes following clearcutting. Effects of partial cutting on slope stability in Southeast Alaska are relatively unknown. Further, the displaced roots of uprooted trees can disturb the subsurface soil whenever trees are blown down by heavy winds or when stumps are loosened or removed during tree harvest. Under natural conditions, windthrow is an important triggering device of debris avalanches and flows in Southeast Alaska. Recent research in Southeast Alaska (Swanston 1989) has suggested that although less than 10 percent of all landslides in the past 20 years were related to logging or roads, logging and roads may increase the potential for landslides in a given area.



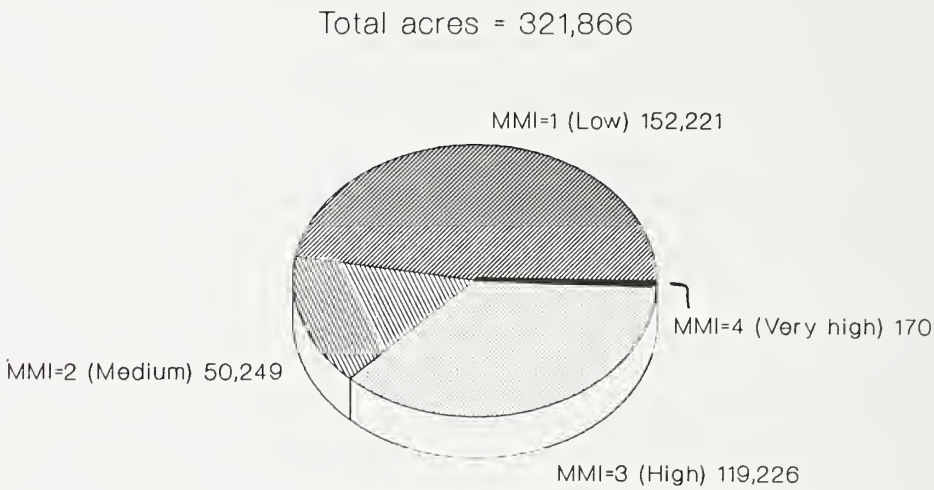
A broad analysis of soil stability conducted in the past five years on the Project Area was based on the Ketchikan Area Soil Survey. Landslide mass movement index (MMI) ratings were used to group soil map units that have similar properties with respect to the stability of natural slopes. Four classes of mass movement index—1(low), 2 (medium), 3 (high), and 4 (very high)—have been assigned to soil map units according to their relative potential for landslides, as indicated by their physical properties. Soils with very high MMI are not harvested and are excluded from the tentatively suitable CFL base, as described in the TLMP Draft Revision, Timber Suitability Classification, pp. A1-16.

Figure 3-8 shows total acres of each mass movement index class in the Project Area. These figures represent MMI classes as identified from the Soil Resource Inventory maps in the GIS. MMI ratings in the GIS are based on general characteristics of

typical soil map units. Actual MMI class may be higher or lower depending on field investigation.Naturally unstable soils are common throughout the CPOW Project Area. Areas where concentrations of high MMI soils occur are located in VCU's 571, 580, 588, and 590. Very high MMI soils include shallow, fine-textured soils on slopes greater than 75 percent, and on slopes with restricted drainage occurring on slopes steeper than 65 percent.

Maps in the Planning Record display the distribution of high and very high MMI soils within the Project Area in relation to roads and harvest units for each alternative. These areas are also displayed for each unit in Appendix G (Unit Cards).

Figure 3-8
Inventoried Mass Movement Index Classes in the Project Area



Floodplains, Riparian Areas, and Wetlands

Floodplains and Riparian Areas

Floodplains are composed of naturally-eroded sediments carried by the stream or river and deposited in slack water sections of channels during high water periods. Floodplains are considered to be areas subject to a one percent (100 year-recurrence) or greater chance of flooding in any given year. Nutrient-rich sediments underlain by coarse-textured sediments make floodplains the most productive lowland timber, wildlife, and fisheries resource sites on the Tongass.

Riparian areas include stream or lake systems and the adjacent land. Approximately 6,045 acres of riparian area based on soil characteristics are mapped within the Project Area. *Riparian area soils* are identified in greater detail on the map describing soil groups, found in the Planning Record. A *riparian ecosystem* is identified in part by soil characteristics or distinctive plant communities that require free or unbound water (FSM 2526.05).

The definition of riparian areas based on soil types (6,045 acres) used in this section is different from the broader definition of riparian habitat used in the Wildlife section of this chapter (18,422 acres). One reason for the difference is the relatively large scale used to classify soil types, which cannot account for numerous small areas. Another reason is that the evaluation of riparian habitat for wildlife purposes included protective buffers designated by TTRA and Forest Service standards and guidelines

as well as soil types. For an illustration of riparian habitat characteristics, see Figure 3-22 in the Wildlife section of this chapter.

Approximately 39 percent (2,327 acres) of all existing riparian areas within the Project Area were harvested between 1954 and 1990. Most of the harvest occurred in the Staney Creek watershed (VCU 588), with approximately 535 acres of riparian area cut. This equates to 88.5 percent of the riparian area in this VCU, or approximately 3 percent of the entire VCU. Other areas where extensive amounts of riparian areas have been harvested include: VCU's 581, 580, and 590, with 337, 317, and 227 acres of harvest respectively.

Riparian areas previously harvested for timber are now in various stages of secondary plant succession. Except where the ground is highly disturbed, the stand composition on the secondary successional riparian areas is similar to the riparian vegetation prior to timber harvest, with spruce, hemlock and cedar forming the tree canopy. On the more disturbed sites, the vegetation is often composed of early successional species, such as alder and salmonberry.

Wetlands

Wetlands are defined as: "those areas that are inundated or saturated by surface or groundwater with a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions" (40 CFR 230.41(a)(1)). Approximately 53 percent of the Project Area is classified as wetland. These include muskegs, estuaries, freshwater sedge meadows, forested wetlands (commercial and non-commercial), and freshwater streams. Descriptions of characteristics for these wetland types can be found in the TLMP Draft Revision (1991a). Estuaries are discussed in more detail in the Fisheries section of this chapter. The total area of each wetland type within the Project Area is shown in Table 3-11. A wetlands map of the Project Area can be found in the Planning Record.

Table 3-11
Wetland Type on Project Area

Wetland Type	Acres
Open Muskeg (Peatland)	65,031
Forested Scrub/Shrub	97,705
Estuary	48
Lakes and Ponds	7,178
TOTAL WETLANDS	169,962

Value and Function. The natural and beneficial values and functions of each wetland type differ in terms of their benefit to wildlife habitat, fish habitat, hydrologic properties (flood flow moderation, groundwater recharge and discharge), site productivity, and water quality protection.

Wetlands are associated with significant values and functions. *Values* are defined here as socio-economic in nature, including: aesthetics, commercial fishing (critical salmon

habitat provided by estuaries, streams, and lakes), development sites (for example, buildings and roads), community water supplies, actual and potential recreation, and timber harvesting. *Functions* are ecosystem attributes and can be organized as follows:

• *Physical functions*: flood conveyance, coastal erosion barriers, water retention and regulation, heat absorption, and sediment collection.
• *Chemical functions*: acidic water pH levels, high tannins, and ability to accumulate significant carbon and nutrients (nitrogen).
• *Biological functions*: timber production (generally in lower volume classes), provision of critical habitat for fish (notably salmon) and wildlife (notably waterfowl and bears), and provision of smaller animals as part of the food web. Wetlands feature high plant and animal diversity.

While wetlands values and functions are clearly of a great management importance, their quantification remains incomplete. Area soil scientists, ecologists, hydrologists, and other specialists are working to further define functions and values in Southeast Alaska ecosystems.

Wetlands include muskegs, estuaries, freshwater sedge meadows, forested wetlands, and freshwater streams. Wetland values and functions are of great management importance.

Effects of the Alternatives

Soils: Direct and Indirect Effects

Soil Productivity

The action alternatives have the potential to reduce soil productivity. However, application of soil management practices for the maintenance or improvement of soil productivity (FSH 2509.18) will limit these reductions below threshold levels (FSM 2554 R10 Supp. 2500-92-1). Furthermore, units were located and designed during the planning process to minimize adverse effects on soil productivity.

Areas of soil presently supporting productive ecosystems would be disturbed in all the proposed action alternatives to varying degrees. Disturbance of sites by road, landing and rock pit construction will result in the loss of soil. Timber harvest may result in soil disturbance, displacement, puddling, or compaction that could reduce soil productivity. Road construction and timber harvest may result in an increase in the occurrence of landslides (Loggy 1974; Swanston 1989) and may result in reduced productivity on those sites.

Mass Movement Index (MMI)

Mass Movement Index (MMI) ratings tell how susceptible soil groups are to landslides under natural conditions

- MMI 1 - low potential for landslides
- MMI 2 - medium potential
- MMI 3 - high potential
- MMI 4 - very high potential for landslides

Table 3-12 displays the acres of low, medium, and high MMI soil disturbance that may occur with each alternative.

Table 3-12
Acres of Low, Medium and High Potential Soil Disturbance by Alternative

Soil Disturbance	1	1a	F2	F3	F4	F5	F6
Low (MMI 1)	0	0	194	159	60	139	193
Medium (MMI 2)	0	0	318	320	434	323	363
High (MMI 3)	0	0	403	632	458	414	437
Total	0	0	1,252	1,110	984	1,056	993

Soil disturbances resulting from landslides and other surface disturbances often result in long-term reduction of soil productivity. The amount of time required for rehabilitation depends on the severity of the disturbance and its exposure to continued aggravating forces.

Soil Erosion

Some soil erosion and landslides will occur in all alternatives, including the no-action alternative. Erosion will most likely occur on areas where the soil surface has been heavily disturbed or removed. The amount of erosion that occurs will then be related to the amount of soil disturbance that takes place (see Table 3-12.)

Two forms of erosion may be accelerated by timber harvest activity:

- **Surface Erosion** includes sheet, rill, and gully erosion on exposed mineral soils caused by felling and yarding activities, road surfaces, cutbanks, and borrow pits.

- **Landslides**, which may be triggered by: (1) windthrow along cutting unit boundaries; (2) soil disturbance through felling and yarding activities; and (3) road-building activities such as blasting, excavating slope support, overloading slopes by sidecasting excavated soil materials, and directing and accumulating water.

Surface Erosion. Professional judgement of soil scientists who have extensive experience in field operations in the Ketchikan Area of Southeast Alaska suggests that most cable yarding operations result in 5–20 percent mineral soil disturbance. However, it is possible to reduce the surface disturbance to less than 5 percent, thereby minimizing human-induced erosion, by using logging systems capable of achieving partial and/or full suspension of logs during yarding.

The total acres of timber harvested provide a way to compare the amount of soil subject to potential disturbance from harvest activities, which results in increased surface erosion and productivity loss. Of the action alternatives, Alternative F4 includes the fewest acres of harvest and Alternative F5 includes the greatest amount of harvest. Alternatives F3, F2 and F6 rank second, third and fourth in terms of the amount of acres harvested, in decreasing order.

Landslides. Landslides are most likely to occur when roads are constructed on landscapes with very high mass movement indices (MMI). Landslides typically occur less frequently when roads are constructed or timber is harvested on areas with high MMI. In most cases landslides are not as common on areas with medium or low MMI.

A minor degree of soil disturbance is unavoidable under any reasonably practicable timber harvest activity. For the Project Area, only 170 acres of the land base occur on soils inventoried as having a very high MMI. These soils are classified as unsuitable for the production of commercial timber. Thirty-seven percent of the forest land base occurs on soils inventoried as having a high MMI. Units with high MMI ratings will receive special consideration by a soil scientist to mitigate concerns associated with timber harvest. Road construction may require geotechnical evaluation. (See Mitigation Measures, Chapter 2).

Table 3-13 presents data on timber harvest on MMI soils by alternative. Of the action alternatives, Alternative F3 is expected to harvest the least amount of timber (3,081 acres) on high MMI soils, while Alternative F5 is expected to harvest the greatest amount of timber (3,879 acres).

Landslides can be triggered by windthrow, soil disturbance, road building, or other activities on soils with very high MMI. No very high MMI soils would be harvested or disturbed by road building under any CPOW alternatives.

Table 3-13
Acres of Timber Harvest on Mass Movement Index Soils by Alternative

	1	1a	F2	F3	F4	F5	F6
Very High MMI(4)	0	0	0	0	0	0	0
High MMI(3)	0	0	3,548	3,081	3,352	3,879	3,864
Medium MMI(2)	0	0	1,608	1,695	1,726	1,679	1,311
Low MMI(1)*	0	0	4,217	4,743	4,102	4,278	4,170

* indicates as yet unclassified soils, which were evaluated and determined to be low

Road building activities are sources of landslides and sediment. Preliminary monitoring reports of landslides initiated by road construction within the 89-94 KPC Long-term Sale Project Area show that 13 landslides occurred within a two-year period (Landwehr 1992). The total area disturbed from all 13 landslides was less than three acres. A plan that minimizes road building over potential landslide areas would lessen the possibility of landslide occurrence and associated impacts. Table 3-14 presents acres of road clearing resulting from construction on MMI soils for each alternative (clearing limits were assumed to be 75 feet). Of the action alternatives, Alternative F5 proposes building the least amount of road over high MMI soils, and Alternative F4 proposes to build the most over these soil types. It should be noted that much of the specified roads and almost all the temporary roads are inside unit boundaries and are already included within harvested areas.

Table 3-14
Acres of Road Construction by MMI Class by Alternative*

	1	1a	F2	F3	F4	F5	F6
Very High MMI(4)	0	0	0	0	0	0	0
High MMI(3)	0	0	322	397	311	313	319
Medium MMI(2)	0	0	167	213	175	169	138
Low MMI(1)	0	0	450	481	410	385	422

*Includes rock pits.

Table 3-15 presents data on total acres of timber harvest and road constrcution on high MMI soils by Alternative. In order of increasing impacts, Alternatives 1 and 1a are lowest, followed by Alternatives F3, F4, F2, F6 and F5.

"There is a low potential for significant impacts to water quality and fish habitat from management-induced landslides if any of the action alternatives is implemented."

Table 3-15
Acres of Roads and Harvest on Mass Movement Index Soils by Alternative

	1	1a	F2	F3	F4	F5	F6
Very High MMI (4)	0	0	0	0	0	0	0
High MMI (3)	0	0	3,870	3,478	3,663	4,192	4,183
Medium MMI (2)	0	0	1,775	1,908	1,901	1,848	1,449
Low MMI (1)*	0	0	4,667	5,224	4,512	4,663	4,592

* indicates as yet unclassified soils, which were evaluated and determined to be low

There is a low potential for significant impacts to water quality and fish habitat from management-induced landslides if any of the action alternatives is implemented. The results of a recently completed Tongass-wide landslide survey can help illustrate the potential for landslide impacts in the CPOW Project Area (Swanston and Marion 1991). This regional landslides survey, which included only large landslides greater than 100 cubic yards of soil displacement, estimates a natural landslide rate of .93 over 20 years for an area the size of the Project Area. Following timber harvesting, this landslide rate would be expected to increase to 3.3 slides over a 20-year period. However, these results also indicate that a relatively small percentage of sediment generated from large wasting events will reach a stream. Swanston (1989) estimated that the increase in the incidence of landslides over natural occurrences throughout Southeast Alaska was about 3.5 times greater on managed acres.

Swanston's Tongass landslide survey categorized 23 percent of all landslides as debris torrents that occur in deeply cut V-notch gullies. Long-term impacts (greater than 10 years) to channel form and function and to fish habitat would be anticipated for Class I channel segments directly affected by a large landslide (Hogan and Wilford 1989). Based on Swanston's results, there is about a one-in-four chance that any management-related landslide will have a major impact on Class I streams and only a very slight chance that major impacts on fish habitat could occur. It can be inferred that the majority of these debris torrents would affect primarily Class III stream channels, since only about three percent of all natural and management-induced slide events in this survey were shown to directly affect Class I streams.

Care should be taken in extrapolating these results to the Project Area. Road construction and harvesting technology changes, as well as greater sensitivity to water quality and fish habitat concerns (as reflected in BMP's, for example), have resulted in improved management practices for timber operations in landslide prone areas. These factors will tend to reduce management-related landslide incidences in the Project Area from the rate observed by Swanston. On the other hand, many of the areas included in Swanston's survey had road systems that were predominantly located on stable locations on lower valley slopes. Roaded segments in the Project Area are proposed on relatively steep slopes, a factor which would tend to increase the potential incidence of road-related landslides. Thus, the frequency of landslide occurrence in

the area is difficult to predict; however, areas with a high potential for landslide occurrence were evaluated in the planning process, and timber harvest was deferred in many of these areas during unit design (see Appendix C).

Soils: Cumulative Effects

Effects of the proposed action alternatives upon long-term soil productivity are directly related to the amount of soil disturbance that occurs through time and the amount of recovery that takes place in the soil system during this time. The soil is a complex system with the capacity to absorb and recover from many of the impacts resulting from a project of this nature.

Table 3-16 shows the potential cumulative acres of timber harvest and road construction projected through the life of the Long-Term Contract. Alternative F3 would have the greatest effect in 1996. Alternatives F2, F4, F5 and F6 show a balance of soil disturbance by current activities (1993) and future activities. In all instances, the actions proposed would minimize soil disturbance to the maximum extent practicable through implementing the BMP's in the Soil and Water Conservation Handbook (FSH 2509.22).

The reasonably foreseeable future (2004) timber harvest is expected to be approximately 356 MMBF (see Appendix A). For this analysis it is assumed to equal 12,478 acres of timber harvest and approximately 165 miles of road construction (which translates to about 1,500 acres), for a total of 13,978 acres of potential soil disturbance.

Table 3-16
Cumulative Acres of Timber Harvest and Road Construction

Alternative	1993*	1996**	2004***
1	87,014	87,014	100,992
1a	85,995	85,995	99,973
F2	87,014	95,712	109,690
F3	87,014	95,751	109,729
F4	87,014	95,613	109,591
F5	87,014	96,110	110,088
F6	87,014	95,520	109,498

* Already cut; includes timber harvest and road construction.
** 1993 + proposed (Table 3-9)
*** 1996 + 12,478 acres harvest + 1,500 acres road right of way

Floodplains, Wetlands, and Riparian Areas: Direct and Indirect

Floodplains

Executive Order 11988 directs Federal agencies to provide leadership and take action on Federal lands to avoid to the extent possible the long- and short-term adverse impacts associated with the occupancy and modification of floodplains. Agencies are required to: 1) avoid the direct or indirect support of floodplain development whenever there are practicable alternatives; 2) evaluate the potential effects of and proposed action on floodplains; 3) ensure that planning programs and budget requests

consider flood hazards and floodplain management; and 4) prescribe procedures to implement the policies and requirements of the Order.

Impacts upon floodplains for the alternatives are generally limited to effects of road construction. The small area (74 acres) of floodplains proposed for actual timber harvest would not affect flooding or erosion.

During road construction, both direct and indirect impacts to floodplains may occur. There may be no detectable influence, or there can be flow alteration in minor streams because of routing by roadside ditches and culverts. Channel and flow alteration may locally affect the velocity of flows, width, and depth of water, and the location of flow. Such factors may physically result in different erosion and sediment transport characteristics.

TLMP Draft Revision (1991a) standards and guidelines will be used to minimize impacts on floodplains as well as to protect roads and drainage structures. Examples of such practices include designing bridges and culverts to handle the expected flows, and installing frequent cross drains or ditch relief culverts to minimize erosion from large concentrations of water moving overland or where they center natural drainages.

Wetlands

Executive Order 11990, as amended, requires Federal agencies exercising statutory authority and leadership over Federal lands to avoid to the extent possible the long- and short-term adverse impacts associated with the destruction or modification of wetlands. Federal agencies are required to preserve and enhance the natural and beneficial values of wetlands in carrying out their responsibility for: 1) acquiring, managing, and disposing of lands and facilities; 2) providing federally undertaken, financed, or assisted construction and improvements; and 3) conducting Federal activities and programs affecting land use.

BMP's also will be used to minimize impacts to wetlands. Examples of such practices include designing harvest systems capable of removing timber by full suspension or some other low impact yarding system where forested wetlands are planned for harvest. Details of BMP's relevant to the alternatives are discussed in Chapter 2.

Data for proposed roads and units on wetlands were derived using the Ketchikan Area GIS data base. Wetland types and/or habitats were generated using soil inventory maps in the GIS, based on correlations between soil series and plant associations (DeMeo and Loggy, Forest Service Report, unpublished).

Approximately 53 percent (169,962 acres) of the Project Area classifies as wetland; 30 percent (97,705) is forested wetland. Many of the forested wetlands on the Project Area do not support commercial or economic stands of timber and are not scheduled for harvest in this or future plans. Larger muskegs supporting no commercial timber, will not be harvested, but may be affected by yarding operations within the unit. Table 3-17 presents data on proposed harvest on wetlands by alternative. Of the action alternatives, Alternative F3 harvests the least amount of forested wetlands, while Alternative F4 harvest the most acres. Alternatives F2, F6, and F5 rank second, third and fourth in terms of most acres of forested wetlands proposed for harvest.

Harvesting wetlands involves manipulation of the vegetation, which temporarily changes the hydrology of the site. Patric (1966) suggests an increase in water yield

may result from timber harvest. A temporary increase in soil moisture is expected until vegetation is reestablished.

Timber site productivity on wetland soils is typically lower than on better drained soils. Growth rates on wetland sites are expected to be slower than non-wetland sites, and merchantable timber may not be available in a 100-year rotation. Areas where slow growth is expected ranges from 30 to 42 percent of the total harvest, depending on alternative (Table 3-17).

Table 3-17
Acres of Proposed Harvest Activity on Wetlands by Alternative

	1	1a	F2	F3	F4	F5	F6
Total Harvest	0	0	9,373	9,519	9,180	9,836	9,345
Wetland Harvest	0	0	3,754	2,852	3,874	3,080	3,208
Percent of Total	0	0	40	30	42	31	34

New road construction on wetlands will be limited to the needed transportation components of roads, landings, and drainage structures. Best Management Practices (BMP's) will be used, especially with regard to the use of wetlands as filter strips to capture sediment. Ditch construction will be minimized on open muskegs to the extent consistent with minimizing water accumulations on the road surface and sediment production.

Rock overlay construction on wetlands covers the vegetation but provides a highly permeable fill that minimizes changes in hydrologic conditions. No changes in chemical conditions are anticipated.

Table 3-18 presents data on proposed wetland alterations caused by road construction for each alternative. Alternative F5 affects the fewest wetland acres with road construction, and Alternative F3 affects the most acres.

Table 3-18
Acres of Wetlands With Proposed Road Construction by Alternative

Wetland Category	1	1a	F2	F3	F4	F5	F6
Forested Wetlands	0	0	465	614	411	438	482
Muskeg	0	0	217	232	190	188	196
Estuary	0	0	0	0	0	0	0
Total	0	0	682	846	601	626	678

Roads through wetlands can affect the flow of water in the wetland. Placement of culverts and other road drainage features will ensure that flow and reach of water in the wetland are maintained at a natural level. Impacts from roads will be limited to the wetland directly underlying the road prism and associated cuts and fills.

Application of BMP's during construction will assure that water flows, circulation patterns, and chemical and biological characteristics of the water within wetlands will not be impaired. Additionally, use of BMP's will assure that adverse impacts to the aquatic environment will be minimized. In terms of terrestrial environment, wildlife use of wetlands for travel ways and predation may be reduced during periods of vehicular traffic on the roads.

Floodplains, Riparian Areas, and Wetlands: Cumulative Effects

Riparian Areas

Table 3-19 summarizes the number of road crossings that will affect riparian areas within the three Aquatic Habitat Management Unit (AHMU) stream classes (Class I, II). All existing road reconstruction and all proposed new road construction are included.

Table 3-19
Number of Road Crossings on Class I and II Streams in Riparian Areas

	Alternatives						
Streams	1	1a	F2	F3	F4	F5	F6
Cl.I	0	0	38	29	28	12	27
Cl.II	0	0	16	24	19	15	22

Table 3-20 lists the percentage of riparian management areas (outside TTRA buffers) which will be harvested, by alternative. These areas are predominantly small inclusions within the harvest unit. BMP's will be applied to all riparian areas in harvest units.

Table 3-20
Riparian Management Areas (RMA)* Within Harvest Units, by Alternative

	1	1a	F2	F3	F4	F5	F6
% of Harvest in RMA	0	0	0.9	0.7	1.2	0.7	0.8

*outside TTRA buffers

Wetlands

One area of concern involves effects of logging and road construction on altering the water release and retention function of wetlands, particularly peatlands. These activities may also affect sediment transport across the landscape. By harvesting trees, water tables can be altered and adequate tree regeneration becomes a concern.

The cumulative effects of road building and logging of forested wetlands within watersheds over time are another concern. The assumptions described below will be used to assess these effects.

Assumptions.
- The operable timber base will remain the same. All analysis will be based on the operable timber within the VCU.
- Standards and guidelines for harvest and road construction activities will remain constant over the remaining contact period.
- Future accessibility of timber in relation to wetlands will be similar to the accessibility encountered in this sale.
- Borrow pits are not located on wetland sites.
- Distribution of wetlands is similar in all VCU's. This is not accurate for all VCU's; however, it is a necessary assumption for statistical purposes.

Cumulative Effects of Timber Harvest on Wetlands. Prior to 1993, approximately 78,526 acres of timber were harvested in the Project Area. Approximately 25,726 of those acres, 33 percent, are wetlands. During this operating period, between 2,852 and 3,874 acres of wetlands are scheduled for harvest, depending on alternative (Table 3-17, earlier in this section).

The reasonably foreseeable future (2004) harvest is expected to be approximately 356 MMBF (see Appendix A), and harvest approximately 12,478 acres. To obtain an estimated acreage of wetlands harvested, it is assumed that 33 percent of the 12,478 acres will be wetlands, or approximately 4,160 acres. Cumulative acres of timber harvest on wetlands in the CPOW Project Area are shown in Table 3-21.

Table 3-21
Cumulative Acres of Timber Harvest on Wetlands

Alternative	Total Wetlands (Acres)	Wetlands Harvested Acres 1993	1996	2004
1	169,962	25,726	25,726	29,886
1a	169,962	25,410	25,410	29,570
F2	169,962	25,726	29,480	33,640
F3	169,962	25,726	28,578	32,738
F4	169,962	25,726	29,600	33,760
F5	169,962	25,726	28,806	32,966
F6	169,962	25,726	28,934	33,094

Cumulative Effects of Roads on Wetlands. Prior to 1993, approximately 2,264 acres of wetlands within the Project Area have had roads constructed over them. This equates to approximately 1.4 percent of all wetlands within the Project Area. The action alternatives propose up to 846 acres of additional road construction on wetland areas (Table 3-18, earlier in this section). The rock overlay construction techniques commonly used in Southeast Alaska maintain the hydrologic, chemical, and nutrient regimes of the wetlands. Some localized vegetation changes from open muskeg to forested wetlands have been observed around roads that have been drained with

ditches. Of note is the tendency for roads in wetland areas to grow closed with alder unless vegetative growth is prevented by road maintenance.

It is estimated that an additional 160 miles of new road construction will be necessary to access future timber entry through the reasonably foreseeable future (termination of the Long-Term Contract in 2004). Assuming the same clearing limits (75 percent) and assuming that 40 percent of the roads will be built on wetlands, an additional 600 acres of wetlands will have roads constructed over them.

WATER RESOURCES

Key Terms

Anadromous - fish that spend part of their time in freshwater and part of their lives in saltwater
Biotic - living
Mitigation - measures designed to counteract environmental impacts or to make impacts less severe
Sediment - solid materials in suspension or transported by water, gravity, ice, or air
Solute - substance dissolved in a solution
Turbidity - an indicator of the amount of sediment suspended in water

Affected Environment

The water resources of the Project Area can be described under the categories of: (1) streamflow regime (hydrology); (2) water quality, including sediment, water temperature, and water chemistry; and (3) consumptive water use. These are influenced by climate, which is discussed in the Introduction to Chapter 3. Additional information about watersheds and fish habitats is discussed in the Fisheries section of this chapter.

Streamflow Regimes

River and stream systems are located throughout the Project Area. These usually drain east or west to tidewaters. All streams and rivers produce a large volume of water per unit of land. Runoff varies greatly, depending on the time of year. Spring snowmelt is the likely cause of increased runoff between April and June. In some streams spring runoff can often approach fall runoff, which generally is the period of highest stream flows. Two relatively low flow periods are characteristic of these systems: the first occurs between January and March due to snow and ice accumulation, and the second during mid-July to August due to low precipitation.

Water Quality

Changes in any of the physical and chemical properties of water can directly affect water use by people and other living organisms. The most important characteristics for water management on the Project Area are (1) sediment, and (2) chemical properties, especially dissolved oxygen and introduction of foreign chemicals. These water quality characteristics correspond to the key water quality parameters identified in the State of Alaska water quality criteria for maintaining natural productivity of stream, lake, and estuary organisms. Water temperature is an additional characteristic that influences water quality, particularly for fish habitat. Stream temperatures are discussed in the Fisheries section of this chapter.

Sediment

Solid materials in suspension or transported by water, gravity, ice, or air are called sediments. Sediments in streams may be transported as either suspended or bedload sediment. Suspended sediment is carried within the water column, while bedload material moves (rolls or bounces) along the bottom of the stream or riverbed. Suspended sediment causes water to appear murky or turbid. Under natural conditions both suspended and bedload sediments move during storm runoff events. The rate of sediment transport depends on discharge velocity and availability of materials.

Stream sediment originates from both geologic processes and human activities. The main natural processes creating sediment are landslides and actively developing stream systems. A regional study (Swanston 1989) indicates that about three percent of all major landslides directly affect fish-bearing streams. Steep terrain and large amounts of rainfall make the land sensitive to natural sediment production.

Concentrations of suspended sediments in the area normally are less than 10 parts per million (ppm) in winter, 4–30 ppm in summer, and occasionally over 100 ppm in the fall during storm runoff. These relatively low levels are attributed to the dense vegetative ground cover.

The major sources of management induced sediment in the area result from: (1) road construction activities (bridges and culverts), (2) road use and maintenance, and (3) logging activities.

Sediment produced by installation of culverts and bridges is temporary. The amount of sediment produced depends on such factors as the soil grain size, parent material, velocity and volume of water, and the duration of the mechanical disturbance. In studies on stream sedimentation, data gathered before, during and after the construction of a small bridge showed significant increases in sediment produced during removal of small sapling and root wads; after three and one-half minutes, the amount of sediment decreased (1989-94 LTS EIS).

Road construction concentrates disturbance along a corridor which produces sediment over a longer period. The majority of sediment production occurs two to five years following initial road construction (Huecker, cited in USDA Forest Service 1992b). Short-term (one to two days) water quality degradation near construction is likely.

Continued use and maintenance of road surfaces and ditches exposes soil to erosion. As use is reduced and exposed soil becomes vegetated, the rate of erosion and delivery to streams generally will be reduced (Reid and Dunne 1984). The rate and extent of this reduction depends upon the rate of vegetation establishment, which maybe enhanced by closing roads and seeding exposed soil.

Timber harvest operations other than road construction tend to disperse soil disturbance over large areas. Suspended sediment levels from logging activities are low even in heavily logged watersheds. In two watersheds near Hollis, Prince of Wales Island, where clearcuts exceeded 2,000 acres in size, suspended sediments in the Harris River during and following logging never exceeded 3.7 ppm under average flow conditions or 148 ppm during peak flows. In the Maybeso watershed, suspended sediments never exceeded 7 ppm during average flow or 38 ppm during peak flows (1989-94 LTS EIS).

Alaska Water Quality Standards require that turbidity (an indicator of suspended sediment) not exceed 25 NTU (Nephelometric Turbidity Units) over natural conditions for propagation of fish, and that fine sediment (0.1 mm to 4.0 mm) concentrations not increase by more than 5 percent or exceed a total of 30 percent by weight in stream gravels (ADEC 1989). Data taken from some streams on Prince of Wales Island indicate a mean turbidity value of 1.3 NTU under natural conditions (1989-94 LTS EIS).

Water Chemistry

Dissolved oxygen is typically at or near saturation in fast-running streams because the churning action tends to bring oxygen into the water. In many lakes and in streams which have smooth, low flows, oxygen concentrations may drop below saturation. Such decreases in dissolved oxygen saturation usually occur in summer dry periods with higher water temperature, when natural biotic demand for dissolved oxygen is at its peak. State of Alaska Water Quality Standards for dissolved oxygen content call for not less than 7 mg/l or 45 percent of saturation for fish, and in no case greater than 17 mg/l or 110 percent of saturation.

The measure of pH indicates the degree of weak acids and bases in the natural waters. This is important for aquatic ecosystems because it affects the solubility of many toxic compounds, particularly heavy metals such as copper. pH is measured in units ranging from 0 to 14. The lower the pH number the higher the acid level; a pH of 7.0 is considered neutral. Water quality data collected in the Project Area indicate a pH range between 6.6 and 7.6 (L.Bartos, USDA Forest Service, Ketchikan Area, unpublished data). These measurements are within the standard established for growth and propagation of fish by the State of Alaska (pH 6.5 to 8.5 and not varying more than 0.5 units from natural) (ADEC 1989). Muskeg streams naturally have pH values lower than state standards of 6.5.

Water is a solvent and a mechanical erosive agent. It contains many dissolved minerals as well as undissolved sediments in suspension. Although water in Southeast Alaska is never completely free of organic and inorganic matter, water quality is high with regard to chemical content. Concentrations of total dissolved solids are typically less than 150 ppm.

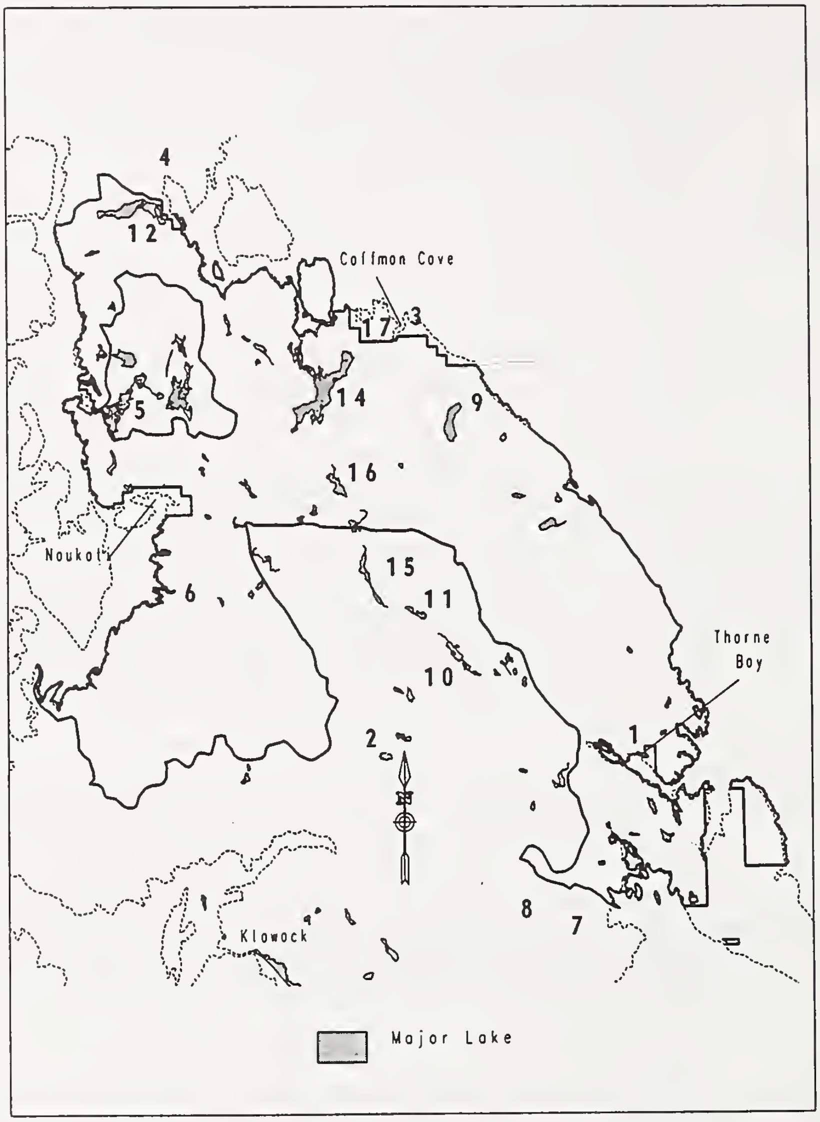
In the past, introduction of foreign chemicals—such as fertilizers, herbicides, and accidents involving commercial transportation of toxic substances and petroleum products—into surface waters of the area has been very low. Fertilizers are generally used only when grass seed is planted on road cuts and some landslides to mitigate surface erosion. Herbicides are generally not used on the Tongass. The main potential for contamination of foreign chemicals in surface waters in the Project Area is the use of petroleum products from logging operations.

A March 26, 1992 Memorandum of Agreement (MOA) between the Forest Service and the State of Alaska Department of Environmental Conservation (ADEC) has committed these two agencies to National Forest water quality protection tasks described in the Alaska Nonpoint Source Pollution Control Strategy, approved by the U.S. EPA in August 1990. The MOA was created to ensure that Forest Service activities meet Federal consistency requirements of specified sections of the Clean Water Act and Executive Order 12088. The MOA also establishes the Forest Service as the agency responsible for monitoring and protecting water quality of National Forest lands in Alaska for the purposes of the Clean Water Act, as amended (USDA Forest Service and ADEC 1992).

Consumptive Water Use

Key consumptive water uses within the Project Area include domestic water supply, recreation (cabin water supply use), and some commercial uses. There are no congressionally designated municipal watersheds within the Project Area. However, domestic water supplies for the communities of Thorne Bay, Coffman Cove, and Whale Pass occur within the CPOW Project Area. Coffman Cove also uses water for commercial propagation of oysters. A list and map of consumptive water uses and locations within the Project Area are shown in Figure 3-9.

Figure 3-9
CPOW Consumptive Water Uses



1	Thorne Bay Community	10	Thorne Lake Shelter
2	Control L. Admin. Site	11	Twin Lakes Campsite
3	Coffman Cove Community	12	Neck Lake
4	Whale Pass Community	14	Sweetwater Lake Cabin
5	Sarkar Lake Cabin	15	Honker Lake Cabin
6	Staney Creek Cabin	16	Hatchery Lake Campsite
7	Karta River Cabin	17	Big (108) Creek Research Site
8	Salmon Lake Cabin		

Effects of the Alternatives

Direct and Indirect Effects

The effects of the many land management activities on resident and anadromous fish, on human water supplies, and on other beneficial water uses are complex and not easily quantified. The following sections discuss the effects on water quality, and the risks and magnitude of these effects. Potential effects are categorized as direct, indirect, and cumulative based on potential changes in erosion, sedimentation, stream temperature, recruitment of large woody debris, and the stream nutrient cycle. Further details on impacts to fish habitat and production from proposed alternatives are discussed in the Fisheries section of this chapter.

Streamflow Regimes

Timber harvesting can potentially affect streamflow regimes by increasing the frequency and magnitude of peak storm discharges, by increasing summer base flows immediately following harvest, and by decreasing stream base flow through changes in canopy structure or stand density (Harr 1983). Forest vegetation influences stream runoff because trees and other plants use water during photosynthesis, and intercept and evaporate rain and snow. Extensive clearcut blocks may alter runoff by changing the amount of snow stored and the timing of snowmelt in the spring.

Much scientific literature addresses the effects of timber harvest on water yield from forested stream basins. These research results indicate that a minimum harvest level of 25 to 35 percent of a drainage basin is generally required before water yield increases by measurable amounts. Water yield studies in the Pacific Northwest have shown a 25 percent average increase in annual water yield for 5 to 10 years following 25 to 100 percent clearcut harvest of the study watersheds (Rothacher, 1965; 1970; Rothacher et al. 1967; and Harr 1976; 1983). No increase in fall peak flows has been observed in rain-dominated coastal watersheds except in cases where a high percentage of a watershed is compacted by roads and skid trails. Recent studies in the Pacific Northwest have shown that harvesting in the transient snow zone has increased the magnitude of winter peak runoff events in the Cascade Mountains of Oregon (Christner and Harr, 1982; Harr 1981).

Water yield responses to timber harvest activities have received very little study in Southeast Alaska watersheds. No measurable changes in streamflow were observed in the Maybeso watershed following clearcutting of 25 percent of the drainage basin (Meehan et al. 1969). An analysis of Staney Creek drainage basin following a 35 percent clearcut harvest did show significant increases in summer low flows (Bartos 1989). Several variables (elevation, aspect, basin geomorphology, soils, vegetation, geology, snow storage, and precipitation pattern, cutting unit size, distribution of units within the watershed, and scheduling of harvest entries) could all influence stream runoff.

BMP's applied in the CPOW Project Area would reduce the potential for drastic changes in streamflow regimes. By not harvesting in Class I and II riparian areas that are the major source area for summer baseflow, the potential for reducing summer lowflows and consequently reducing rearing and spawning habitat for salmonids should be low. See Mitigation Measures, Chapter 2, for a discussion of the stream buffering that will be done under all action alternatives. Where harvest units are dispersed throughout a drainage basin, the potential for increasing the frequency of destructive rain or snow flood events should lessen.

Sediment

Some increases in sediment delivery to streams above naturally occuring rates can be expected to result from timber harvest and road construction (Rice et al. 1979; Madej 1982; Reid and Dunn 1984; Furniss et al. 1991; Chamberlin et al. 1991). Estimates of sediment delivery to Southeast Alaska streams from timber harvest indicate that sediment increases are minimal and not distinguishable from natural fluctuations in sediment yield (Paustian 1987).

Sediment will be generated in each action alternative from short-term and long-term land disturbing activities. Sediment production and delivery to streams is roughly proportional to the amount of road constructed, the amount of use, the number of stream crossings, the proximity of the road to the stream, area of timber harvested, yarding system used, and the amount of naturally produced sediment. Construction of new roads exposes soil, which may be eroded and cause sediment delivery to streams. Yarding and road construction on high or very high mass movement index soils may cause landslides that generate sediment. See the Soils section of this chapter for detailed effects of yarding and road construction and reconstruction on MMI soils.

Sediment from management activities may continue to be generated long after roads are constructed, timber is harvested, and stream crossings are in place. Use of the Prince of Wales road system will continue following project implementation; therefore, control of potential long-term sediment production from road use and maintenance will have to be continued to minimize impacts. (See also the Access Management Plan portion of the Transportation and Facilities section of this chapter.)

The extent to which stream crossings deliver sediment depends on the maintenance strategy applied after harvest. If culverts and bridges are maintained, little additional sediment is produced. If structures are left in place and not maintained, large amounts of sediment can be delivered if they fail. Removal of crossing structures and restoration of the channel would produce sediment for a short time (Stednick et al. 1978); however, cumulative sediment delivery would be greatly reduced in the future (Furniss et al. 1991).

Application of Best Management Practices (BMP's) and standards and guidelines will minimize sediment delivery to streams by controlling surface erosion from roads and harvest units. This will be accomplished by avoiding or mitigating landslide and surface erosion potential, and by proper design and installation of road drainages and stream crossings (see Chapter 2, Mitigation Measures).

The effectiveness of BMP's is primarily determined by the degree to which instream water quality meets State water quality standards. Although numerical standards are included in the Alaska State water quality regulations, measurements are difficult to routinely apply to the regulation of nonpoint sediment sources on road construction and timber sale sites. The Environmental Protection Agency (EPA) has detemined that the reasonable implementation, application and monitoring of BMP's achieves compliance with the intent of the Clean Water Act. Water quality studies conducted in Southeast Alaska indicate that except for short-term localized deviations from numerical standards, BMP's are effective in maintaining sediment concentrations within State standards (Paustian 1987).

The action alternatives would result in a continued supply of raw wood products to the Ketchikan Pulp Company mill at Ward Cove, Alaska. This would indirectly affect water quality in the immediate area. The indirect and cumulative effects of the

proposed action alternatives will be a continuation of the existing local water quality at Ward Cove.

Consumptive Water Use

The effect of the proposed action on the consumptive uses of the water resources of the area will be insignificant in all alternatives. Application of BMP's will maintain water quality for domestic and comercial water uses, as well as the other uses identified.

Cumulative Effects

Most watersheds within the Project Area have experienced prior roading and timber harvesting. BMP's would largely limit most effects of sediment and increased flows from roads and harvest units (see Unit Cards, Appendix G, for site specific application). According to the TLMP Draft Revision, by 2140 all suitable and available forested land within the Project Area will be harvested and the transportation system will be constructed.

Unless a cumulative watershed effects analysis is performed on watersheds within the Project Area, a 35 percent ground disturbance of the land base within a 3rd order or larger watershed is the threshold within a 15-year period under standards and guidelines for cumulative effects (TLMP Draft Revision, pg. 4-63, 1991a). This harvest threshold is necessary to minimize cumulative watershed effects which would adversely affect soil and water resources and result in changes in stream channel equilibrium (such as: changes in sediment transport leading to stream aggradation, degradation and/or streambank erosion; silting of pools; and reduction in aquatic habitat capability). A thorough Cumulative Watershed Effects Analysis requires intensive data inputs pertaining to watershed conditions. To date, this type of analysis cannot be performed due to lack of data.

The risk of unplanned events and cumulative effects is related to the amount of timber harvest, rate of harvest, and location of roads within a watershed. Although the amount of risk cannot be quantified, the frequency of such events in the past has been low, and the risk of future unexpected detrimental effects should be minimal because of the implementation of standards, guidelines, and other protective measures. (See also the LTF/marine benthic portion of the Transportation section of this chapter.)

Table 3-22 displays the percent of watershed affected by existing and proposed ground disturbing activities and associated roading during the 15-year period, 1981-1996. All watersheds are within the prescribed threshold.

Table 3-22
Cumulative Watershed Effects, Percentage of Watershed Harvested and Roaded in 3rd Order or Larger Watersheds

Watershed Number	Watershed Harvested and Roaded 1981-1996 (Percent) by Alternative 1	1a	F2	F3	F4	F5	F6
A54A	4	4	4	4	4	4	4
A55A	30	30	31	31	31	30	30
B19A	0	0	0	0	0	·0	0
B21A	0	0	0	4	4	4	3
B24B	3	3	3	7	5	4	4
B25C	1	1	1	1	1	1	1
B27A	0	0	0	0	0	0	0
B28A	0	0	1	1	1	1	1
B38A	0	0	0	0	0	0	0
B43A	1	1	2	2	1	1	1
B44A	0	0	1	1	0	0	0
B45B	0	0	0	0	1	1	0
B46C	19	19	20	20	20	20	20
B47D	0	0	0	0	0	0	0
B53A	8	8	14	15	15	15	9
B54B	22	22	25	25	25	25	26
B55C	12	12	17	16	17	17	16
B56A	8	8	12	12	9	9	13
B57A	13	13	16	16	16	16	16
B58B	7	7	8	8	8	8	8
B59C	4	4	8	8	9	9	9
B61A	15	15	15	15	15	15	19
B62A	12	12	12	12	12	12	12
B63A	25	25	25	25	25	25	25
B65A	17	17	17	17	17	17	17
B66A	6	6	22	22	23	23	22
B67A	20	20	20	20	20	20	20
B68A	16	16	16	16	16	16	16
C20D	3	3	3	3	3	3	3
C21C	13	13	14	15	14	14	15
C22B	17	17	17	27	17	17	18
C23A	16	16	21	23	21	21	23
C26C	5	5	6	5	6	6	6
C27B	5	5	8	7	7	7	7
C29A	0	0	1	1	0	0	1
C32C	6	6	13	8	12	12	13
C34A	0	0	10	3	10	10	10
C36A	0	0	3	2	3	3	3
C37A	0	0	6	6	1	1	2
C39A	3	3	4	5	4	4	1

continued

Table 3-22 continued

Watershed Number	Watershed Harvested and Roaded 1981-1996 (Percent) by Alternative F1	F1a	F2	F3	F4	F5	F6
C40A	8	8	8	8	8	8	8
C44A	0	0	4	5	5	5	7
C45D	5	5	7	6	7	7	6
C46D	0	0	0	0	0	0	0
C48C	2	2	2	2	2	2	2
C49B	4	4	11	10	10	10	12
C53A	0	0	0	0	0	0	0
C56A	0	0	0	0	0	0	0
C63A	0	0	0	0	0	0	0
C67A	13	13	13	13	13	13	13
C70A	12	12	19	18	19	18	19
C72A	0	0	0	5	5	0	0
C74B	0	0	0	0	0	0	.0
C95B	23	23	23	23	23	23	23
C96A	6	6	8	6	8	8	8
C99C	7	7	7	10	11	11	14
D01B	19	19	19	20	20	20	21
D02C	3	3	3	3	3	3	3
D03B	3	3	3	3	3	3	3
D08A	0	0	0	0	0	0	0
D12A	2	2	2	2	2	2	2

Stream crossing structures contribute little additional sediment after harvest if they are maintained or removed.

Table 3-23 displays the percent of high gradient contained stream channels (Channel types A1,A2,A4,A5,A6,A7,D2,D7) which have been harvested or proposed for harvest during the period of 1976–1996, in 3rd order or larger watersheds. The Forest Plan Draft Revision limits cumulative harvest rates in this land use designation to 25 percent or less of a 3rd order or larger watershed every 20 years. This guideline will be exceeded in two of the Project Area's watersheds, B54B, and C70A, by the proposed CPOW project. In B54B, the high gradient contained stream channels make up about 6 acres of a 3,870 acre watershed. Timber harvest is proposed in about 5 of these acres. CPOW action alternatives in watershed C70A will increase timber harvest along high gradient contained channels within the past 20 years from about 19 to 27 percent, exceeding TLMP Draft Revision guidelines by about 2 percent. However, watershed C70A is actually a subpart of a larger watershed, which was divided based on the Project Area boundary. The majority of the watershed is outside the Project Area. The overall watershed including the lands outside the Project Area boundary do not exceed the standard and guideline. Other area watersheds which exceed this guideline represent existing conditions and will not be affected by the CPOW project. The analysis also assumes that all partial cuts are treated as clearcuts. Actual acreage affected and environmental effects may be less due to the partial cutting.

Table 3-23
Cumulative Watershed Effects, Percentage of High Gradient Contained Process Group Harvested

Watershed	Process Group Harvested 1976–1996 by Alternative						
Number	1	1a	F2	F3	F4	F5	F6
A54A	0	0	0	0	0	0	0
A55A	0	0	0	0	0	0	0
B19A	0	0	0	0	0	0	0
B21A	0	0	0	1	1	1	1
B24B	9	9	9	13	9	9	9
B25C	11	11	12	12	12	12	11
B28A	0	0	0	0	0	0	0
B38A	0	0	0	0	0	0	0
B43A	1	1	7	1	7	7	7
B44A	0	0	0	2	0	0	0
B45B	0	0	0	0	0	0	0
B46C	15	15	16	16	16	16	16
B47D	0	0	0	0	0	0	0
B53A	0	0	0	0	0	0	0
B54B	0	0	83	83	83	83	83
B56A	0	0	0	0	0	0	0
B57A	7	7	7	7	7	7	7
B58B	17	17	19	19	19	19	20
B59C	16	16	18	18	19	19	19
B61A	3	3	3	3	3	3	6
B62A	6	6	6	6	6	6	6
B63A	37	37	37	37	37	37	37
B65A	39	39	39	39	39	39	39
B67A	59	59	59	59	59	59	59
C20D	9	9	9	9	9	9	9
C21C	13	13	14	13	13	13	15

continued

Table 3-23 continued

Watershed Number	F1	F1a	F2	F3	F4	F5	F6
	Process Group Harvested 1976-1996 by Alternative						
C22B	25	25	25	25	25	25	25
C23A	9	9	9	9	9	9	9
C26C	4	4	4	4	4	4	4
C27B	7	7	10	8	8	8	10
C29A	0	0	1	1	0	0	1
C32C	6	6	10	6	9	9	10
C34A	0	0	3	0	3	3	3
C36A	0	0	2	1	2	2	2
C37A	0	0	0	0	0	0	0
C39A	0	0	2	2	2	2	2
C44A	0	0	11	11	11	11	11
C45D	10	10	13	11	13	13	13
C49B	3	3	5	5	5	5	6
C53A	0	0	0	0	0	0	0
C56A	0	0	0	0	0	0	0
C63A	0	0	0	0	0	0	0
C67A	4	4	4	4	4	4	4
C70A	19	19	27	26	27	27	27
C72A	0	0	0	0	0	0	0
C95B	8	8	8	8	8	8	8
C96A	0	0	15	0	15	15	15
C97C	3	3	12	5	11	11	12
C99C	6	6	6	7	7	7	9
D01B	16	16	16	18	18	18	19
D02C	0	0	0	0	0	0	0
D03B	0	0	0	0	0	0	0
D08A	0	0	0	0	0	0	0

Stream Nutrient Cycling

Timber harvesting has not been shown to result in detrimental concentrations of dissolved solutes being flushed into surface water bodies (Chamberlin 1982). High concentration of dissolved nutrients that could impair drinking water or aquatic nutrient cycling are of principal concern. Research on the Hubbard Brook experimental forest in New England measured increases in dissolved nutrient concentrations resulting from clearcutting, slash burning, and herbicide treatments in small watersheds (Pierce et al. 1972). However, similar research on coastal forest watersheds measured only slight releases of key dissolved nutrients resulting from clearcutting and slash burning treatments (Fredriksen 1971). In Southeast forest ecosystems, dissolved nutrients are tightly bound by soil organic matter and plant root hairs. Soil and water chemistry monitoring on a small subbasin that was clearcut and burned in the Pavlof drainage near Tenakee, Alaska, measured no loss in total nitrogen and only slight leaching of potassium, magnesium, and phosphorus into surface water (Stednick et al. 1982). The results of these investigations suggest that no measurable effects on chemical water quality or aquatic productivity would occur as the result of clearcut harvesting in the CPOW Project Area.

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FISHERIES

Affected Environment

Key Terms

Aelvin - newly hatched salmon that are still attached to the yolk sac
Adfluvial - fish that ascend or descend from freshwater lakes to breed in streams
Alluvial fan channel - a fan-shaped deposit of sand, gravel, and fine material made by a stream where it runs out onto a level plain or meets a slower stream
Anadromous - fish that ascend from the sea to breed in freshwater streams
Aquatic Habitat Management Unit (AHMU) - areas for managing the resources associated with streams and lakes
Channel types - the defining of stream sections based on watershed runoff, landform relief, and geology
Glide channel - channel types that occur on lowlands and landforms, and are mostly associated with bogs, marshes, or lakes
Large Woody Debris (LWD) - any large piece of relatively stable woody material having a diameter of at least 10 centimeters and a length greater than one meter that intrudes into a stream channel; also called Large Organic Debris (LOD)
Management Indicator Species (MIS) - species whose population changes are believed to best indicate the effects of land management activites; fish MIS for CPOW are coho and pink salmon and Dolly Varden char
Salmonid - refers to the group of fishes to which salmon belong
Watershed - area that contributes runoff water to a waterway

Introduction

Abundant aquatic resources in the CPOW Project Area provide a number of diverse fish spawning and rearing habitats. Four species of salmon (pink, chum, sockeye, and coho), two species of trout (cutthroat and rainbow, including sea runs of cutthroats and steelhead trout), and one species of char (Dolly Varden) inhabit the freshwater within the area. These fish species are valuable not only for the commercial fish industry, resident sport fisheries, subsistence use, and charter boat/lodge operators, but also as a valuable food source for bears, eagles, and other wildlife. A number of nongame fish species including sculpin, stickleback, and smelt occur in Project Area waters (Taylor 1979).

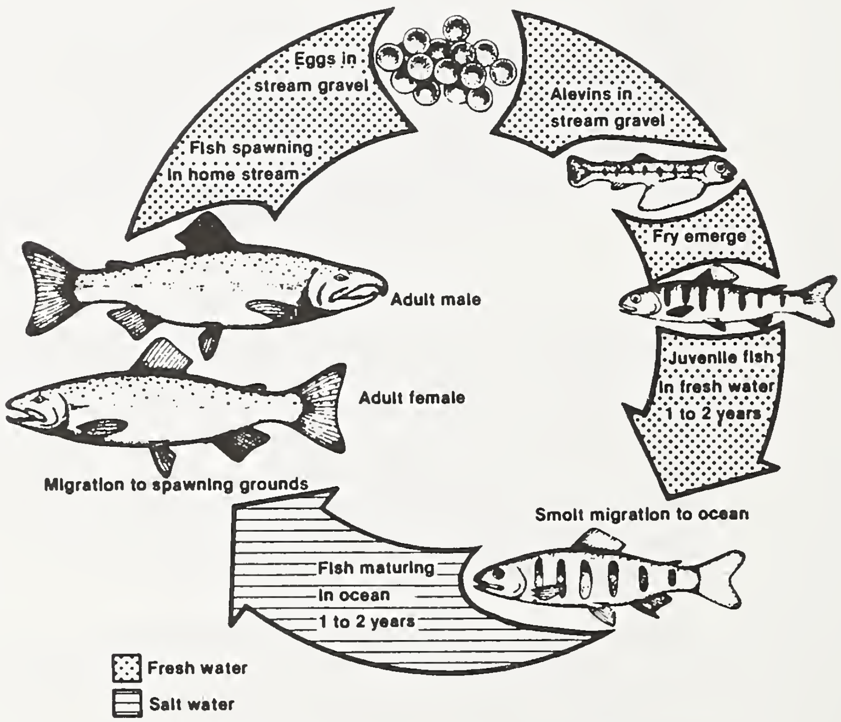
Anadromous fishes spend at least part of their life in freshwater and part in saltwater. Salmon lay their eggs in stream gravels, and the juvenile fish hatched from the eggs emerge from the gravels. Depending on the species of salmon, the amount of time the juveniles spend in freshwater is variable. Pink salmon immediately start their downstream migration, while coho salmon juveniles may spend more than two years in freshwater before migrating to the ocean. Pink and chum salmon are especially dependent on estuaries during their early life stages. Salmon reach maturity out in the

ocean, only to return to their natal streams to start the cycle again. Steelhead trout follow the same cycle as coho salmon, except they often survive the spawning season, return to the ocean, and complete the cycle again.

Adfluvial fishes such as resident trout and char spend all of their life in freshwater, spawning in stream bed gravels and growing to maturity in the streams and lakes of the area.

Estuaries are unique systems because they form transitions between terrestrial, freshwater, and marine environments. Estuaries are rich and diverse, harboring many resident species and providing food, spawning areas, or shelter for numerous other species at critical points in their life cycle (USDA Forest Service 1985). On Prince of Wales Island, crab, shrimp, clams, mussels, and various marine fishes are associated with the estuaries and surrounding waters which form a nursery for their young. Herring and smelt also use these areas for spawning and feeding.

Cave systems found on Prince of Wales Island also provide unique habitat important to the fisheries of the area. Karst (limestone) waters flowing into and through caves are extremely productive and are used by salmon and other fishes for feeding, protection from predators, shade, and for spawning. See the Cave Resources section of this chapter for details.



Typical life cycle of anadromous salmonids.

Fish Habitat

Fish habitat is described and categorized in several ways, including: (1) stream classification, (2) Aquatic Habitat Management Units (AHMU's), (3) watersheds, and (4) habitat capability.

Stream Classes

CLASS I STREAMS
Provide high quality habitat for anadromous and sport fishes

CLASS II STREAMS
Provide habitat for resident fishes, but have limited sport fishing value

CLASS III STREAMS
Have potential influence on water quality of downstream aquatic habitat

Stream Classification

Three classifications of fish use of streams have been identified for the Tongass National Forest. The three stream classes are also used to define AHMU classes in the AHMU Handbook (FSH 2609.24). The definitions are as follows:

Class I. Streams with anadromous or adfluvial lake and stream habitat. Also included is the habitat upstream from migration barriers known to be reasonable enhancement opportunities for anadromous fish, and habitat with high value resident sport fish populations.

Class II. Streams with resident fish populations and generally steep (6–15 percent) gradient. These fish have limited sport fishing values.

Class III. Streams with no fish populations but with potential water quality influence on the downstream aquatic habitat.

All mapped streams in the CPOW Project Area have been assigned a channel type (USDA Forest Service 1992). Channel typing as developed on the Tongass National Forest is an inventory and planning tool that stratifies stream and lake sections within a watershed into different stream process groups. The process groups are based on physical characteristics of streams and predict their physical response to different management activities. For an in-depth description of stream process groups, see Appendix D of the TLMP Draft Revision, Proposed Revised Forest Plan (USDA Forest Service 1991a). For management requirements, see Appendix I of the TLMP Draft Revision, pp.12–20 (USDA Forest Service 1991a).

Channel types are used to assign stream classes, particularly if stream-specific information is unavailable. Of the 1,935 miles of streams in the Project Area, some 1,894 miles were mapped and channel typed. Approximately 781 miles of stream in the Project Area are classed as accessible to anadromous fishes (Class I), and 320 miles are inhabited by resident fishes (Class II). (See Table 3-26.)

There were approximately 1,000 miles of previously unmapped streams identified during development of CPOW MELP. These streams were originally identified using aerial photos and topographic maps. They were shown as 'unclassified' in the Draft EIS, but for analysis in the Final EIS have been preliminarily channel typed and stream classed by Thorne Bay and Craig ranger district fisheries biologists. These newly classified streams are incorporated in all analyses within this section. Subsequent field reconnaissance will verify stream class and channel type to determine appropriate management prescriptions.

Channel types are also an indicator of the amount and quality of fish habitat within the CPOW Project Area. The amount and quality of rearing habitat predicted by the various channel types has been established through field studies within the Tongass National Forest (Murphy et al. 1987).

Aquatic Habitat Management Unit Designation (AHMU)

Aquatic Habitat Management Units (AHMU's) are areas for management of the . resources associated with streams and lakes. AHMU class designations reflect integrated resource management considerations for fish habitat, forest type, geology, soils, topography, and water quality. See the AHMU Handbook (FSM 2526.03 and FSH 2609.24) for further details on AHMU definitions.

AHMU widths are classified for the area according to the stream channel type that is present within the specific AHMU. The physical characteristics and channel type sensitivities, and upland management influences within the AHMU, can be evaluated based on the inventoried conditions and responses of the channel types. Additonal widths for riparian, high mass movement soils (MMI-4), and uneven aged management zones may be applied beyond AHMU widths. Table 3-24 displays the AHMU widths along both sides of streams and lakes.

AHMU's are areas for management of the resources associated with streams and lakes.

Table 3-24
AHMU Widths Along Lakes and Streams

Channel Type*	Stream Process Group	Plan Level Minimum Distance (ft.)	Plan Level AHMU*** Distance (ft.)
FP1	Floodplain	150	414
FP2	Floodplain	100	332
FP3	Floodplain	100	220
FP4	Floodplain	100	398
FP5	Floodplain	150	516
AF1	Alluvial Fan	150	342
AF2	Alluvial Fan	100	226
AF8	Alluvial Fan	100	300
PA1	Plustrine	100	230
PA2	Plustrine	150	418
PA3	Plustrine	100	278
PA4	Plustrine	100	308
PA5	Plustrine	100	250
E	Estuary	1,000	1,000
ES1	Estuarine	100	254
ES2	Estuarine	100	266
ES3	Estuarine	100	280
ES4	Estuarine	100	360
ES8	Estuarine	100	332
LC1	Large Contained	100	308
LC2	Large Contained	100	320
MM1	Moderate Gradient Mixed Cont.	100**	234
MM2	Moderate Gradient Mixed Cont.	150	392
MC1	Moderate Gradient Contained	150	336
MC2	Moderate Gradient Contained	100**	260
HC1	High Gradient Contained	100**	226
HC2	High Gradient Contained	100**	234
HC3	High Gradient Contained	100**	246
HC4	High Gradient Contained	100**	236
HC5	High Gradient Contained	100**	226
HC6	High Gradient Contained	100**	240
HC8	High Gradient Contained	100**	300
HC9	High Gradient Contained	100**	312

* For descriptions see Channel Type User Guide, USDA Forest Service 1992.
** If stream Class I or II.
*** Plan Level AHMU distance is claculated from adding one half bank full width to maximum RMA and multiplying by 2.
SOURCE: FSH 2609.24, TLMP Revision (Scheduled for release in 1993)

Table 3-25 displays the overall condition of AHMU's by process group when totaled for the CPOW Project Area. This table shows the amount of AHMU in acres, the amount previously harvested before the Tongass Timber Reform Act (TTRA) was enacted, and the percentage of the total AHMU acreage previously harvested. Table 3-25 includes new preliminary channel typed streams.

Table 3-25
Status of AHMU's

Stream Process Group	Channel Type*	Total AHMU Acres	AHMU Acres Harvested	Previous % Acres Harvested**
Floodplain	FP1,PF2,PF3,PF4,PF5	2,293	421	18
Alluvial Fan	AF1,AF2,AF8	3,484	1,170	33
Palustrine	PA1,PA2,PA3,PA4,PA5	4,608	419	9
Estuarine	ES1,ES2,ES3,ES4,ES8	225	34	15
Large Contained	LC1,LC2	2,552	612	24
Mod Gradient Mixed Control	MM1,MM2	8,135	2,341	28
Mod Gradient Contained	MC1,MC2,MC3	5,370	779	14
High Gradient Contained	HC1,HC2,HC3,HC4,HC5 HC6,HC7,HC8,HC9	22,810	5,129	22
TOTAL		49,477	10,905	22

* For descriptions see Channel Type User Guide, USDA Forest Service 1992.
** Pre-TTRA

Watersheds

There are more than 1,900 miles of streams within the CPOW Project Area. The Project Area can be broken down into a number of watersheds, or areas that contribute runoff water to a particular waterway. Value Comparison Units (VCU) have land area that approximates a third order or greater watershed and is used in this EIS for comparison purposes only. Such a breakdown enables biologists to evaluate various management activities on fish habitat and its capability to produce fish. Many of the watersheds within the Project Area are small, averaging 350 acres and ranging from one to 3,627 acres. Many of these watersheds contain streams that have no name other than the Alaska Department of Fish and Game Anadromous Stream Catalog number. Additional analysis on watersheds is located in the project files. For a summary of miles of stream in the Project Area, see Table 3-26.

In addition to streams, the CPOW Project Area has approximately 7,213 surface acres of lakes and approximately 6,400 acres under the influence of estuaries. These areas also provide high quality salmonid habitat.

It is common for several species of anadromous salmon and trout to use the same reach of stream for migration, spawning, and rearing. Where resident fish occupy the same reaches of the stream as anadromous salmonids, the resident trout are not found in large numbers. Several watersheds within the Project Area were identified

Table 3-26
Miles of Class I, II, and III Streams for the Project Area, by VCU

VCU	Cl I	Cl II	Cl III	Not Classified*	Total No. Miles
549.2	15.6	9.0	15.4	0.9	40.9
550	22.6	17.1	19.2	1.1	60.0
551	12.1	8.6	1.5	4.9	25.6
552	11.5	8.0	8.1	0.0	27.6
553	24.7	4.9	6.8	2.7	39.1
554.2	23.2	10.9	17.1	0.0	51.2
557	3.6	5.8	17.8	0.0	27.2
571	72.7	26.8	2.0	0.2	101.7
572	11.3	9.4	14.2	0.7	35.9
573	78.4	15.4	44.8	2.2	140.8
574	36.3	13.9	25.8	1.5	77.5
577	43.0	24.4	5.7	1.7	74.8
579	15.9	5.6	45.5	1.9	68.9
580	30.9	5.2	60.0	0.0	96.1
581	33.4	11.2	40.7	0.7	86.0
582	1.3	2.3	26.3	1.2	31.1
583	24.9	8.3	34.2	0.4	67.8
584	16.9	11.7	59.6	6.4	94.6
585	29.2	6.7	10.5	1.0	47.4
586	32.0	5.5	22.6	1.1	62.0
587.1	12.6	13.4	17.8	0.7	44.5
588	100.7	24.1	84.8	3.8	213.4
589	56.0	31.6	91.4	3.3	182.3
590	25.2	26.9	84.5	4.7	141.3
598	33.3	10.9	17.0	0.0	61.2
599	10.8	1.2	8.3	0.1	20.4
600	2.3	0.6	9.7	0.0	12.6
601	1.2	1.3	0.7	0.0	3.2
TOTAL	781.6	320.7	792.0	41.2	1,935.8

* Includes existing and new streams GIS layers. Those streams and any new streams found during field recon for final layout, will be classified and the proper AHMU requirements applied.
SOURCE: Zellmer 1993

as Gold Pin watersheds (high quality sport fishing, visual, recreation values), including the Thorne River system, Sarkar system, Luck Lake, and Sweetwater Lake system. Staney Creek is a Red Pin watershed, with a high quality cutthroat fishery and recreationl opportunities. Stream systems important to sport, subsistence, and commercial fishery interests include Eagle Creek, Logjam Creek, Mabel Creek, Hatchery Creek, Ratz Creek, Thorne River, and Naukati systems. Table 3-27 gives additional information on these important stream systems within the Project Area and fish species found in them.

Table 3-27
Important Stream Systems within the Project Area, and Fish Species

VCU	Stream Name	Location	Fish Species
553	Mabel Creek	East shore, Outlet to Whale Pass	Coho, Pink, Sockeye, Chum, Cutthroat Dolly Varden, Steelhead
554.2	Sarkar Creek	West shore, EL Capitan Passage, Outlet at head of Sarkar Cove	Coho, Pink, Sockeye Chum, Cutthroat Dolly Varden, Steelhead
571	Naukati Creek Yatuk Creek Gutchi Creek	West shore, EL Capitan Passage, Naukati Bay	Coho, Pink, Sockeye, Chum, Cutthroat Dolly Varden, Steelhead
573	Sweetwater Lake System	Northwest side, Lake Bay drainage	Coho, Pink, Sockeye Chum, Cutthroat Dolly Varden, Steelhead Rainbow Trout
574	Hatchery Creek	Northwest side, south of Sweetwater Lake	Coho, Pink, Sockeye Chum, Cutthroat Dolly Varden, Steelhead Rainbow Trout
577	Logjam Creek	Northwest side, south of Sweetwater Lake	Coho, Pink, Sockeye Chum, Cutthroat Dolly Varden, Steelhead Rainbow Trout
581	Eagle Creek	Northwest side, Clarence Strait South of Coffman Cove includes Luck Lake	Coho, Pink, Sockeye Chum, Cutthroat Dolly Varden, Steelhead Rainbow Trout
584	Ratz Creek	East side, Clarence Strait, Ratz Harbor	Coho, Pink, Chum, Cutthroat Dolly Varden, Steelhead
588 590	Staney Creek	West side, Tuxekan Passage, South of Kussan Point	Coho, Pink, Chum, Cutthroat Dolly Varden, Steelhead
579	Lava Creek	North of Thorne Bay, Tributary to Thorne River	Coho, Pink, Chum, Cutthroat Dolly Varden, Steelhead
580	Thorne River North Fork	North of Thorne Bay, Tributary to Thorne River	Coho, Pink, Sockeye Chum, Cutthroat Dolly Varden, Steelhead Rainbow Trout

SOURCE: Zellmer 1993 and ADF&G Division of Sport Fish, Stream Summary, 1992.

Large Woody Debris. Large woody debris (LWD)—trees and tree pieces greater than four inches in diameter and 10 feet long—is one of the most important components of high quality fish habitat. Also known as Large Organic Debris (LOD), this material provides food and building materials for many aquatic life forms, provides cover for juvenile and adult fish, and is the primary channel-forming element in some channel types (Heifetz et al. 1986).

The maintenance of woody riparian vegetation is important as a source of nutrient input. As debris accumulates in streams, it creates pools, traps nutrient-laden organic matter, and supports aquatic insects and other food items for fish. In Staney Creek, LWD decreased flows and increased the abundance of aquatic insects (Salo 1972). Shaheen Creek studies compared old-growth, buffered, and clearcut area effects on LWD and habitat characteristics, finding that LWD provided by buffer zones was able to support higher coho densities from summer through winter by protecting important winter habitat (Uberuaga 1983).

Gradual entry of LWD into the aquatic system is desirable to maintain stream habitat diversity and stability. Large amounts entering abruptly can be detrimental to the aquatic ecosystem by becoming a physical barrier and causing bank erosion and channel migration problems. In most cases, however, gradual and consistent input of LWD is important to maintain stream productivity (Harris 1989).

Past management practices have reduced the total amount of large in-channel woody material in some streams on the CPOW Project Area. Prior to the enactment of TTRA, timber often was harvested to the edge of the streams, and stream cleaning operations were commonly conducted to prevent perceived fish passage problems. Cleaned streams have consistently shown lower over winter survival rates than unharvested or harvested-but-buffered streams (Heifetz et al. 1986, Bryant 1983, 1985, Bjornn et al. 1991).

Stream Temperature. Water temperature affects the metabolic rate of aquatic organisms and can affect the migration timing of adult and juvenile fish. Small changes in water temperature can affect emergence of fry from the gravels and have a fairly large effect on eventual adult survival (Holtby and Scrivener 1989). Reductions in canopy cover may produce increased temperatures in summer and reductions in winter.

The shading of streams is important because direct-beam solar radiation is the primary factor influencing temperature change in summer. The effect of partial canopy removal is directly proportional to the reduction in canopy providing shade to the stream. Buffer strips along streams provide a relative degree of shading depending on a number of factors including vegetative structure and density. Another factor is the measure of the angle of the sun to the canopy and slope of the ground. Buffer strips with widths of 100 feet or more generally provide the same level of shading as that of an old-growth stand (Beschta et al. 1987). Harvest of streamside vegetation, as well as the total amount of harvest in a watershed, can affect water temperature. Timber harvest to the streambank is suspected of raising stream temperatures to a level which may contribute to adult fish kills, although no direct link has been established (KPC 1989, KPC 1991).

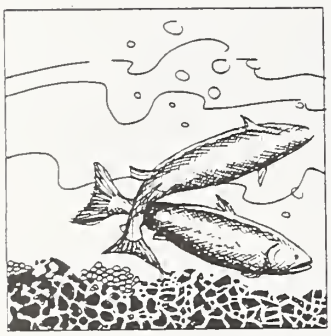
The TLMP Draft Revision has placed a threshold on commercial harvest on watersheds of less than 35 percent of their land area cut within 15 years. This allows for recovery of the watershed and a reduction of stream temperature sensitivity before

any additional harvest may take place within the watershed (USDA Forest Service 1991a).

Stream temperatures in the Thorne River and salmon producing tributaries of the Staney Creek watershed were reported to "increase much more rapidly in logged than in unlogged study areas" due to streamside removal of vegetation. Rates of temperature increase in water temperature between similar study areas indicated 0.28 degrees C/100 feet (0.50 degrees F) through logged areas and 0.02 degrees C/100 feet (0.04 degrees F) through unlogged forest (Taylor and Gibbons 1973).

Continued sensitivity to temperature changes in streams may be a result of pre-TTRA harvest practices. These may continue until natural reforestation replaces the canopy cover. Temperature studies on Staney Creek revealed that three-year regrowth of vegetation along stream banks after logging did not protect the stream from solar radiation (Salo 1972). Every effort was made through application of TTRA, Riparian, and high mass movement index (MMI-4) soils buffers, in accordance with the Aquatic Management Handbook, to minimize effects of timber harvest and road construction on stream systems.

Low winter temperatures can lead to detrimental winter stream conditions, such as anchor ice formation and freezing of spawning gravels, which can reduce pool size. Low temperatures may be aggravated by removing streamside vegetation. However, estimating the effects is very difficult because of the influences of intermittent snow or ice cover and high variability in winter air temperature, and the influence of wind and precipitation patterns commonly found in Southeast Alaska.



Sedimentation. Aquatic productivity can be influenced by the concentration of sediment in the water column and the amount of fine sediment introduced into spawning gravel. Direct impacts from sediment concentration include filling gravel pore spaces, which reduces water circulation necessary for fish egg and fry survival and growth. Sediment also retards emergence of the young fish after hatching. Young fish can die within the gravel if fine sediment blocks their movement through gravel to open water. During winter, young salmonids use spaces between gravel and rubble to escape the effects of low water temperatures and ice. When these spaces fill with sediment, the young fish must emerge from the gravel and use energy to maintain themselves in the current, reducing their ability to survive.

Suspended sediment may also irritate the mouth and gills of young fish and, if persistent, can erode the gills of larger fish. Such damage may increase fish stress, leading to increased susceptibility to disease. As rearing pools fill with sediment, rearing space is reduced, lowering habitat capability, and increasing stress and vulnerability to predators. Sediment indirectly affects fish by reducing populations of aquatic insects which are important fish food, increasing competition for food items, weakening unsuccessful feeders, and reducing the number of fish that can be produced from a stream section. Salmonids are generally sight feeders, and turbid water reduces their feeding efficiency.

Studies of the Harris River, Twelvemile, Maybeso, Old Tom, and Indian creeks indicate a drop in the survival rate of eggs and fry due to an increase in fines during the 1954 through 1964 harvest season (Salo 1967, Sheridan 1964, McNeil and Abnell 1961). The Northern Thorne River, Snakey Lakes, and Tinkerbell Lake were surveyed for impacts of logging on sediment movement and condition of spawning areas during the 1972 to 1973 harvest season. Recommendations were made on a site-specific basis (Kingsbury 1974), including: leave strips, not logging high gradient hillsides, seeding

and stabilizing existing slides, roads constructed to not degrade sterams from June through August, yarding timber away from streams, evaluating potential enhancement sites, deferring logging in Snakey Lakes until Wilderness study is finalized. Maybeso Creek was studied for sediment movement, effects of log jams, and flooding (Helmers 1966). It was found that log-debris jams intensify streambed instability, especially during floods, and temporary or unstable jams may be detrimental to salmon egg and larval survival.

Fish Kills. Some stream systems have a greater potential to develop higher temperatures, including: those coming from small watersheds of two square miles or less, slow-flowing streams with southerly aspects, brush-covered stream sides, and streams with shallow lake and muskeg sources (Bishop 1971). Data has been compiled by the Alaska Working Group on Cooperative Forestry/Fisheries (Gibbons 1989) on all known instances of fish kills in Southeast Alaska. The data indicate that fish kills have occurred in both logged and unlogged areas. The Alaska Working Group on Cooperative Forestry/Fisheries (USDA Forest Service 1991c) provided further identification of the relationships between fish kills, identified factors causing these fish kills (such as temperature, long periods of reduced rainfall, numbers of returning salmon, dissolved oxygen content, tidal flow and watershed characteristics), and identified the relationship to timber harvest practices.

The first phase of the identification of the reasons for fish kills was conducted during the summer of 1990 on seven streams on Prince of Wales Island, under the direction of the Alaska Working Group on Cooperative Forestry/Fisheries Research (Pentec Environmental, Inc. 1991). The research was designed to address the physical in-stream reasons for adult fish kills (also known as pre-spawner mortality). Although no actual fish kills were observed, the conclusions of the study included:

1. Fish respiration by adult spawners can cause significant reductions of dissolved oxygen concentration during summer low flows;
2. Dissolved oxygen reductions caused by fish respiration can occur at water temperatures well below lethal levels;
3. Stream discharge and spawner abundance were the primary factors controlling dissolved oxygen levels during the spawner migration period in the study streams; however, the analysis indicates that fish activity levels could also be important;
4. Low dissolved oxygen concentration as a result of fish respiration in fish holding pools is the most likely factor causing salmon pre-spawner mortality; and,
5. An increase in water temperature will decrease the potential availability of dissolved oxygen and simultaneously increase dissolved oxygen needs of fish, but the effects of these factors on dissolved oxygen concentration are dependent on stream discharge.

Habitat Capability

Management Indicator Species. Management Indicator Species (MIS) are species whose population changes are believed to best indicate the effects of land management activities (USDA Forest Service 1982). Through the MIS concept, the total number of species occurring within a project area is reduced to a manageable set of species that collectively represent the complex of habitats, species, and associated management concerns. The MIS are used to assess the maintenance of population viability, changes in biological diversity, and effects on species in public demand.

In the CPOW Project Area, coho and pink salmon have been selected as MIS for anadromous fish species, and Dolly Varden char as MIS for resident species.

Management Indicator Species (MIS)

Fish Management Indicator Species (MIS) for this EIS are:

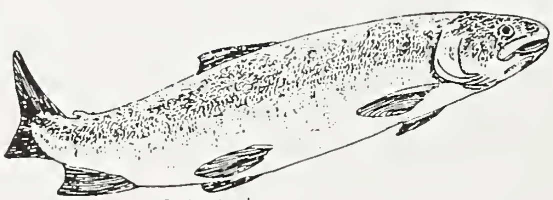
- ✔ Coho Salmon
- ✔ Pink Salmon
- ✔ Dolly Varden Char

For a list of wildlife MIS, see the Wildlife section of this chapter.

Coho (silver) and pink (humpback) salmon were selected to represent two different phases of salmon life history: spawning/egg incubation and freshwater rearing. *Pink salmon*, the most widely distributed of the salmon, spawn in freshwater from August through September. Immediately upon emergence from gravels, juveniles go to sea, where they mature in two years. Pink salmon are important to the commercial fishery of Southeast Alaska, where they represent the greatest poundage harvested; an average of 85 million pounds were harvested between 1979 and 1988 (USDA Forest Service 1991a). The only limiting factor for pink salmon freshwater habitat capability is the quantity and quality of spawning gravel. Spawning bed capacity has been evaluated in Indian Creek and the Harris River where most egg losses were found to increase as the density of female spawners increased (McNeil 1964). Changes in pink salmon fry and adult numbers are primarily due to predation from other fish, birds, and mammals, including humans. There is no empirical evidence in Southeast Alaska that pink salmon have been affected by logging or road construction. This could be attributed, among other reasons, to high variability in sediment flushing rates in Southeast Alaska streams.

Coho salmon also spawn and incubate in freshwater, but after emergence from the gravels, juvenile coho rear in streams and ponds for two years before migrating to the ocean, where they mature in two years, reaching 6 to 20 pounds. Coho are important to the commercial troll fishery and marine sport fishery of the region. An average of 1.67 million fish per year between 1979 and 1988 (USDA Forest Service 1991a) were harvested in Southeast Alaska. Because cohos spend more time in freshwater, habitat capability for this species is limited not only by the quantity and quality of spawning gravel, but also by the ability of the freshwater to support overwintering young salmon. Small lakes, backwater ponds, and pools formed by large woody debris provide this overwintering habitat (Irvine and Johnston 1992, Nickelson et al. 1992a, Nickelson et al. 1992b). In summer, relatively deep pools in small streams are preferred (Bugert 1991). Buffers (100 foot or greater, of stable, windfirm, old growth) along with AHMU's are designed to provide a continuous supply of LWD to maintain coho spawning and rearing areas.

Dolly Varden char were selected to represent resident fish habitats because of their wide distribution, availability of data on the species' habitat requirements, and distribution over the full spectrum of resident fish habitats. Dolly Varden are also present in their anadromous form in the area. Habitat capability for this species is limited by the quantity and quality of spawning gravel and the availability of small lakes and relative deep pools in streams to support overwintering.

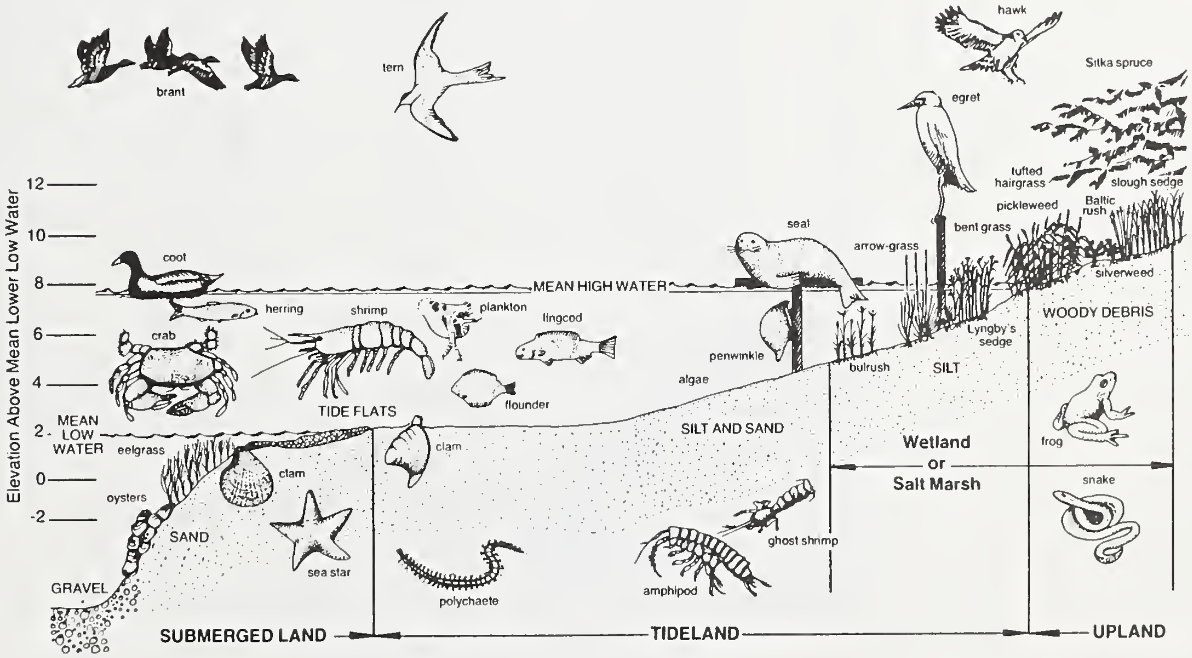


Dolly Varden

Habitat capability models. Fish habitat capability (production) is estimated using Fish Habitat Capability models (HSI). The models are used only to compare the relative effects of alternative actions. They are not intended to suggest actual numbers of fish produced by the streams, but only as an indication of habitat potential.

Determining precisely how many fish are produced from a given channel type is difficult because the fish may use a variety of areas at different points in its life. For example, a coho spawning in suitable gravels on the tail end of an alluvial fan channel may proceed to the estuary for summer rearing and a period of rapid growth in a more fertile environment. During the summer they may be found close to the bottom in water less than eight inches deep (Bugert 1991). This same fish might then return upstream to a glide channel offering sufficient overhead cover for overwintering.

The estimated habitat capability for each watershed in the CPOW Project Area to produce coho and pink salmon and Dolly Varden char is listed in Table 3-28, by VCU. Between 1954 and 1993, there was an increase of .34 percent in pink salmon habitat capability, and decreases of .83 percent chum salmon and 1.51 percent Dolly Varden habitat capabilities. The estimated 1993 habitat capability potential of the CPOW Project Area is approximately 81.5 million pink salmon fry, 1.1 million coho salmon fry, and 2.6 million Dolly Varden char. This does not include fish habitat capability for species such as sockeye salmon, chum salmon, steelhead trout, and cuttroat trout.



Some coho salmon may move from freshwater spawning channels into fertile estuaries for summer rearing and a period of rapid growth in this rich and diverse environment, before returning upstream for the winter.

Table 3-28
Habitat Capability for Coho Salmon, Pink Salmon and Dolly Varden Char, by VCU

VCU	Name	Coho Salmon Capability* (Smolts)	Pink Salmon Capability** (Smolts)	Dolly Varden Capability*** (Fish)
549.2	Sarheen	10,222	233,041	41,499
550	Neck Lake	95,900	0	229,571
551	Whale Pass	7,295	961,205	41,711
552	Barnes Lake	6,949	987,997	16,615
553	Mabel Creek	26,579	308,107	90,349
554.2	Sarkar	59,965	1,708,728	117,991
557	Tuxekan Narrows	17,958	558,736	0
571	Naukati Bay	81,325	3,825,049	168,942
572	Coffman Cove	10,558	1,953,619	32,802
573	Sweetwater	301,007	8,160,245	617,079
574	Hatchery Creek	41,460	1,246,317	222,892
577	Logjam Creek	26,525	624,344	251,717
579	Falls Creek	4,973	2,366,464	39,367
580	North Thorne	32,633	10,226,027	62,183
581	Luck Lake	59,559	3,824,857	60,555
582	Baird Peak	0	0	4,158
583	Ratz	41,151	4,163,064	98,818
584	Little Ratz	20,635	2,944,817	35,955
585	Narrow Point	23,588	1,709,414	72,863
586	Thorne Bay	18,172	833,183	62,564
587.1	Tuxekan Passage	10,098	1,797,065	28,385
588	Staney	139,007	17,634,976	19,700
589	Shaheen	31,753	7,171,539	87,168
590	Upper Staney	17,696	4,159,140	59,102
598	Salt Chuck	32,011	2,395,877	74,583
599	Tolstoi	13,715	1,162,297	26,238
600	Tolstoi Point	2,888	478,445	9,763
601	Kasaan	52	3,130	552
601.1	Kasaan	480	77,730	1,090
TOTAL		1,134,454	81,515,413	2,573,903

* Coho estimates from 1991 production and includes lake production.
** Pink estimates from 1991 production.
*** Dolly Varden estimates from 1991 production and includes lake production.
N/A Not available
SOURCE: Kessler, June 1993

Pounds of pink, chum, coho, and sockeye salmon contributed to the commercial fishery from the Project Area were estimated using the smolt habitat capability, conversion coefficients for ocean survival, adult harvest, commercial/sport catch ratios, average annual commercial harvest fish weight, and average commercial consecutive 30 year

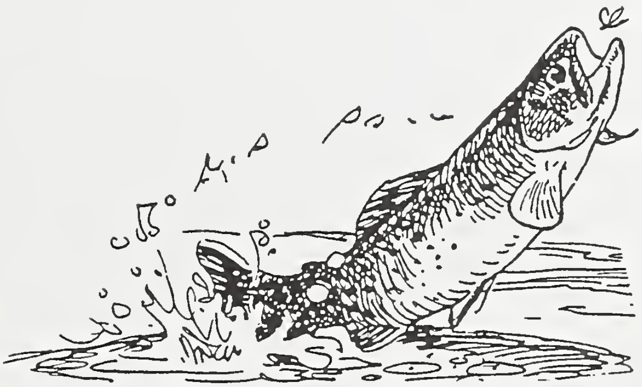
harvest figures for Southeast Alaska. Table 3-29 displays pounds of commercial fish produced from the Project Area.

Table 3-29
Commercial Fish Production From the CPOW Project Area, in Pounds

Coho Salmon	Sockeye Salmon	Chum Salmon	Pink Salmon
622,000	252,000	916,000	1,917,000

SOURCE: Zellmer 1993

For discussions of other physical factors contributing to fish habitat quality and quantity—including sedimentation, water chemistry, and streamflow regimes—see the Soils and Water Resources sections of this chapter.



Effects of the Alternatives

The National Forest Management Act (NFMA) sets the minimum standard for fish habitat protection on all national forests. The Tongass Timber Reform Act (TTRA) further provides specific direction for fish and riparian protection for the Tongass National Forest.

The NFMA requires that no serious and adverse effect occurs to fish habitat; NFMA (36 CFR 219.27 (e)) states, in part:

> "No management practices causing detrimental changes in water temperature or chemical composition, blockages of water courses, or deposits of sediment shall be permitted within these areas [riparian areas] which seriously and adversely affect water conditions or fish habitat."

In addition, the current TLMP (1979a, as amended in 1986) has as a goal to:

> "maintain and enhance the natural fisheries resources by managing some of the highest quality watersheds in ways which would not modify them significantly. In those where major management activities will take place, adequate protection of the aquatic environment will be provided. In addition, it is the intent to take advantage of as many identified fisheries enhancement opportunities as possible."

The TTRA provides direction for fisheries protection in section 103(a). The objective of this section of TTRA is to assure the protection of riparian habitats and to protect fisheries through the application of buffer zones not less than 100 feet in width and through the application of Best Management Practices (BMP's). The Act reads:

> (a) Section 705 (16U.S.C. 539d) of ANILCA is amended by adding at the end thereof the following new subsection: "(e) In order to assure protection of riparian habitat, the Secretary shall maintain a buffer zone of no less than one hundred feet in width on each side of all Class I streams in the Tongass National Forest, and on those Class II streams which flow directly into a Class I stream, within which commercial timber harvesting shall be prohibited, except where independent national forest timber sales have already been sold..... The Secretary shall use best management practices, as defined in the Region 10 Soil and Water Conservation Handbook (FSH 2509.22), January 1990, to assure the protection of riparian habitat on streams or portions of streams not protected by such buffers zones. For the purposes of this subsection, the terms 'Class I streams' and 'Class II streams' means the same as they do in the Region 10 Aquatic Habitat Management Handbook (FSH 2609.24), June 1986."

Direct, Indirect, and Cumulative Effects

Habitat Capability

Timber harvest has potential positive and negative effects on fish habitat capability. Timber harvest may affect the sources of large woody debris, stream stability, water flow, and quality. These effects may be mitigated by Aquatic Habitat Management Units (AHMU), High Mass Movement Soil (MMI 4), and TTRA buffer requirements. Timber harvest, under some circumstances, may have a positive effect on fish by increasing the amount of primary productivity in a stream system. However, these

potential positive effects, which are generally only seasonal in nature, may be diluted by increased flows and are not quantitified in this assessment.

Objectives for management (TLMP Draft Revision) affecting fish habitat include:

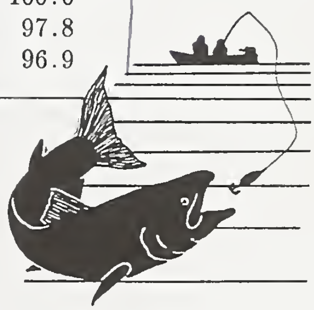
1. Maintain or improve fish habitat capability in channel process groups.
2. Maintain natural stream bank and stream channel processes.
3. Maintain natural and beneficial quantities of large woody debris (LWD) over the short and long term.
4. Maintain water quality to provide for fish production.
5. Maintain optimum water temperatures for salmonids, considering both winter and summer habitat requirements, climate, and natural watershed characteristics.
6. Maintain or improve primary or secondary stream biological production in second-growth forest.
7. Maintain fish passage through stream crossing structures.

The habitat capability models predict no significant reduction in pink and coho salmon and Dolly Varden habitat capability from the CPOW alternatives, regardless of which alternative is selected, including the no-action alternatives (see Table 3-30). The change between 1993 and 1996 is a decrease of 0.2 percent for coho and 0.3 percent for Dolly Varden. No change in pink salmon is projected for any future harvest activity. The reasonably foreseeable future estimated decrease from 1954 to 2004 is 1.47 percent for coho salmon and 2.27 percent for Dolly Varden. The cumulative impacts by 2040 show a decrease from 1954 of 2.40 percent for coho salmon and 3.42 percent for Dolly Varden. Long term cumulative impacts by 2140 is a decrease from 1954 of 2.18 percent for coho salmon and 3.07 percent for Dolly Varden. (Detailed reports by VCU are located in the planning record.)

Pink salmon declines are low because because they use only Class I streams and there is no reduction in large woody debris within 100 feet of streams (except occasional road crossing or yarding corridors). Dolly Varden inhabiting Class I streams and Class II streams that flow directly into Class I streams will not be affected by commercial timber harvest from CPOW's alternatives.

Table 3-30
Habitat Capabilities of MIS as a Percentage of 1954 Capabilities

Species	1954	1993	1996	2004	2040	2140
Pink salmon	100.0	100.0	100.0	100.0	100.0	100.0
Coho salmon	100.0	100.0	99.8	98.5	97.6	97.8
Dolly Varden	100.0	100.0	99.7	97.7	96.6	96.9



There will be no timber harvest within TTRA buffers other than incidental right-of-way clearing associated with stream crossings or skyline corridors. Harvest is authorized within AHMU's. Table 3-31 displays the harvest activities within AHMU's for each alternative.

Table 3-31
Acres of Total Harvest in AHMU Buffers by Alternative

	Alternatives						
VCU	1	1a	F2	F3	F4	F5	F6
549.2	0.0	0.0	0.0	0.8	0.8	0.8	0.8
550	0.0	0.0	1.3	1.9	1.4	1.3	0.0
551	0.0	0.0	0.1	0.1	0.1	0.1	0.1
552	0.0	0.0	0.0	1.4	0.0	0.0	0.0
553	0.0	0.0	0.3	0.1	0.0	0.0	0.0
554.2	0.0	0.0	5.5	5.5	5.5	5.5	5.5
557	0.0	0.0	0.0	0.0	0.0	0.0	0.0
571	0.0	0.0	0.4	0.4	0.4	0.4	0.4
572	0.0	0.0	0.2	0.2	0.2	0.2	0.2
573	0.0	0.0	10.7	6.2	5.6	5.4	18.2
574	0.0	0.0	0.0	0.0	0.0	0.0	1.6
577	0.0	0.0	0.3	0.3	0.3	0.3	0.3
579	0.0	0.0	8.3	4.1	4.1	4.1	8.3
580	0.0	0.0	20.2	12.6	26.2	26.2	20.7
581	0.0	0.0	15.5	1.0	1.2	1.2	16.2
582	0.0	0.0	7.0	7.0	0.0	0.0	7.0
583	0.0	0.0	14.0	0.0	9.7	4.9	14.0
584	0.0	0.0	22.2	12.2	16.4	16.4	20.8
585	0.0	0.0	0.1	0.1	0.1	0.1	0.0
586	0.0	0.0	8.0	7.4	7.4	7.4	8.0
587.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
588	0.0	0.0	45.3	43.7	41.8	41.8	36.9
589	0.0	0.0	0.0	1.5	3.1	3.1	11.8
590	0.0	0.0	31.6	0.0	30.8	30.8	31.6
598	0.0	0.0	0.7	2.6	2.6	0.7	0.7
599	0.0	0.0	0.0	0.0	0.0	0.0	0.0
600	0.0	0.0	0.0	0.0	0.0	0.0	0.0
601	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL	0.0	0.0	196.6	108.9	156.6	149.4	209.8

SOURCE: Zellmer 1992

Table 3-32 shows the total amount of acres of harvest for road construction clearings in AHMU buffers for each alternative.

Table 3-32
Acres* of Road Clearings in AHMU Buffers by Alternative

	Alternatives						
VCU	1	1a	F2	F3	F4	F5	F6
549.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
550	0.0	0.0	6.6	6.8	0.7	3.2	1.7
551	0.0	0.0	0.4	1.0	1.5	0.1	0.5
552	0.0	0.0	0.0	3.8	0.4	0.0	1.5
553	0.0	0.0	5.0	4.6	1.6	0.0	0.7
554.2	0.0	0.0	1.0	2.8	1.8	2.6	0.8
557	0.0	0.0	0.8	0.8	6.0	0.8	0.0
571	0.0	0.0	8.0	7.4	1.8	5.8	4.7
572	0.0	0.0	0.9	0.9	2.4	0.9	0.9
573	0.0	0.0	18.2	12.9	3.6	1.4	19.1
574	0.0	0.0	1.3	1.3	0.4	0.4	0.0
577	0.0	0.0	2.7	2.5	2.6	3.5	3.1
579	0.0	0.0	3.1	3.6	5.6	7.2	7.2
580	0.0	0.0	4.9	6.6	6.6	7.0	3.1
581	0.0	0.0	3.1	1.0	1.3	1.5	2.7
582	0.0	0.0	5.0	5.0	1.2	4.9	5.5
583	0.0	0.0	2.7	2.8	2.7	2.5	4.1
584	0.0	0.0	5.5	2.5	4.8	4.7	5.2
585	0.0	0.0	2.2	1.9	1.8	1.9	0.4
586	0.0	0.0	3.6	3.5	3.1	3.6	3.6
587.1	0.0	0.0	4.2	4.2	4.2	4.1	3.2
588	0.0	0.0	24.2	28.1	24.2	26.1	26.3
589	0.0	0.0	1.2	8.3	9.6	8.5	12.1
590	0.0	0.0	3.3	1.0	1.0	3.3	3.3
598	0.0	0.0	4.0	12.2	12.7	5.2	3.8
599	0.0	0.0	0.0	0.0	0.0	0.0	0.0
600	0.0	0.0	0.0	0.0	0.0	0.0	0.0
601	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL	0.0	0.0	111.9	125.5	101.6	99.2	113.5

* Includes existing and new streams.
SOURCE: Zellmer, 1992

With implementation of any of the alternatives, no substantial reductions are predicted for the MIS. However, there is risk of unanticipated stream habitat effects (such as accelerated numbers of landslides over background levels, blowdown of leave strips, etc.), and the cumulative effects of many small and individually insignificant actions affecting fish habitat capability. The amount of risk is related to the amount of timber harvest, rate of harvest, and location of harvest units within a watershed. Although the amount of risk cannot be quantified, the frequency of such events in the past has been low, and the risk of future unexpected detrimental effects should be minimal because of the implementation of standards, guidelines, and other protective measures.

Harvest on MMI 3 (high mass movement index) soils, miles of road construction and reconstruction, and the number of stream crossings, are indicators of this potential increased risk. For a comparison of acres harvested by alternative on MMI 3 soils, acres of road construction by alternative, and number of stream crossings by alternative, see the Soils section of this chapter.

Temperature Sensitivity

All watersheds within the Project Area meet the TLMP Draft Revision standards and guidelines of limiting harvest to 35 percent of the watershed land base within a 15-year period. Implementation of any of the alternatives under consideration would continue to meet this threshold.

Individual watersheds were analyzed for potential effects on temperature sensitive tributaries. While required TTRA buffers will mitigate most temperature sensitivity concerns, there still is concern about providing vegetation shading to Class III streams that flow through harvest units. Below are listed units and groups of units that have characteristics that may contribute to the temperature sensitivity of nearby streams. These characteristics include one or more of the following: south-facing slopes, lack of immediate downstream forested stream buffers, historical and continued harvest activities, shallowness, flow, adjacency to other units (both new and older cuts not yet providing enough shade), low flow conditions, adjacency to ponds and muskegs, and fish production (FSH 2609.24 Appendix 4). Potential stream impacts will be mitigated by leaving all deciduous trees and conifer trees less than 12 inches DBH within 35 feet of Class III streams; these will remain standing to provide shading and protection for these streams.

Units	Alternative(s)
571-209	F2, F4, F5, F6
571-210	F4, F5, F6
571-213	F2, F3, F6
571-214	F2, F3, F4, F5, F6
583-233	F2, F4, F6
585-204	F3, F6
585-206	F2, F3, F4, F5
585-208	F2, F3, F4, F5
585-210	F2, F3, F4, F5
585-214	F2, F3, F4, F5, F6
588-212B	F2, F3, F4, F5, F6
588-213B	F2, F3, F4, F5, F6
588-324	F6
590-244	F2, F4, F5, F6

Log Transfer Facilities

The effects of log transfer facilities (LTF's) on fisheries resources are not easily quantified. However, the EPA and Alaska DEC have established water quality monitoring lethal concentrations for bark leachates of hemlock and Sitka spruce; these include 50 percent mortality for pink salmon fry, adult and larval pink shrimp, and larval Dungeness crab.(Buchannon 1976). EPA and DEC requirements for water quality standards will be met.

For a discussion of the effects of LTF's on the marine benthic environment see the Transportation section of this chapter.

Aquatic Habitat Research Within the CPOW Project Area

The Aquatic Land Interaction Research Program of the Forestry Sciences Laboratory, Juneau, Alaska, in cooperation with Montana State University and the University of Idaho, has been conducting research to quantify winter residence and survival of coho salmon and debris stability in second growth streams as compared to streams in old growth.

Baseline data was collected from an old-growth stream, Aha Creek, and is the benchmark used in conjunction with data from second-growth streams in the Staney Creek drainage. Information and scientific papers have been published on fish population density and species composition, effect of stream cleaning, relation of cover to standing crop of coho salmon, and overwinter survival requirements of juvenile salmonids.

Harvest units 588-225 and 588-226 are located within the old-growth watershed of Aha Creek. These units were proposed for harvest in the Draft EIS, but were deferred from harvest consideration in the Final EIS to mitigate impacts on research.

Fish Enhancement Projects

Enhancement and rehabilitation opportunities may be developed through Knudson-Vandenburg (KV) habitat improvement projects. KV funds are made available from timber sale receipts and can be used for the enhancement of non-timber resources. Maintenance and monitoring practices will be established on all approved KV enhancement projects. Some potential KV enhancement projects may include: Big Lake and Rio Roberts; fish habitat/basin rehabilitation of Luck, Slide, Sal, Ratz, Gutchi, Yatuk, Shaheen, Slide, Vodatre, and Staney creeks; and a fish pass structure on North Staney Creek (information from the May, 1993, Ketchikan Area 10-year summary data table). These will require additional NEPA analysis before actual implementation. Table 3-33 displays the pounds of fish in commercial harvest contributed by these potential enhancement and rehabilitation projects.

Table 3-33

Fisheries Enhancement Estimated Contribution, in Pounds of Commercial Fish

Salmon	Pounds of Fish	Number of Fish
Coho	22,200	2,883
Pink	45,700	13,848
Sockeye	1,500	242
Chum	8,700	956

SOURCE: Ketchikan Area 10-Year Summary Table, May 1993.

Fish pass structures are among the fishery enhancement projects made possible through KV funds.

TIMBER AND VEGETATION

Key Terms

Commercial Forest Land (CFL) - land that is capable of producing continuous crops of timber (20 cubic feet of tree growth annually, or at least 8 MBF)
Even-aged - management that results in the creation of stands in which trees of essentially the same age grow together
MBF - thousand board feet
MELP - Multi Entry Logging Plan - interdisciplinary design and mapping of all potential timber harvest units, including associated logging and transportation systems, within a project area
Mid-market analysis - an economic estimate of timber value at a point in time when half of the timber was harvested at a higher value and half was harvested at a lower value
MMBF - million board feet
Overstory - the portion of trees in a forest that forms the uppermost layer of foliage; also called the canopy
Partial cut - method of harvesting trees where any number of live trees are left standing in any of various spatial patterns; not clearcutting
Regeneration - the process of establishing a new crop of trees on previously harvested land
Reserved - lands that have been withdrawn from the timber base by an Act of Congress, the Secretary of Agriculture, or the Chief of the Forest Service
Uneven-aged - management techniques that results in the creation of stands that exhibit a range of diameter or age classes

Introduction

Southeast Alaska's forest and nonforest vegetation is valuable for ecological, aesthetic, economic, cultural, recreational, and subsistence reasons. Timber harvesting is an important component of the economy of the region. Since the inception of the long-term contracts, more than 3,000 jobs have been directly or indirectly produced annually by timber harvesting on the Tongass National Forest. In addition, 25 percent of the sum of all timber revenues collected by the USDA Forest Service plus purchaser credit for road construction is returned to the state for use on roads and schools. In 1991 over 9 million dollars were returned to the State of Alaska as their share of timber harvest activities on the Tongass.

Affected Environment

Plant Series and Vegetation Distribution

The natural vegetation of the CPOW Project Area is a mosaic of coniferous forest interspersed with alpine tundra, muskeg (bog), shrubland, estuary, and beach fringe plant communities. The Project Area has been classified into forested plant associations based on the climax plant community (DeMeo et al. 1992), which results from the interaction between landform, climate, and soils. All forested plant associations having the same climax tree(s) are referred to as a series; the series name is based on the climax tree(s). The CPOW Project Area has seven plant series.

Sitka Spruce Series

Plant associations in this series are generally associated with riparian areas and disturbed sites such as stringers between avalanche chutes. This series can also occur in combination with mountain hemlock at higher elevations. Sitka spruce is the dominant overstory tree species, but western hemlock can be a co-dominant. Red alder may also be present. Common shrub species include devil's club, blueberry, and salmonberry. Ferns and skunk cabbage are the dominant herbs. The Sitka spruce series is generally highly productive, and the heights of mature spruce often exceed 150 feet.

Most sites harvested to date on the Project Area have been of the Western Hemlock Series. *J.Canterbury photo.*

Western Hemlock Series

The majority of sites harvested to date on the Project Area have been of the Western Hemlock Series. Plant associations in this series generally occur in the uplands on slopes with moderate to well drained soils. The predominate overstory tree species is the western hemlock, but Sitka spruce occurs in the overstory in numbers related to the frequency of disturbance. The shrub layer is dominated by blueberry and rusty menziesia; devil's club, however, can be a major component in some areas. Bunchberry and five-leaf bramble dominate the herb layer, but skunk cabbage can be a major component in areas with poorly drained soils. Plant productivity is generally high, with mature hemlock often exceeding heights of 125 feet.

Mountain Hemlock Series

These plant associations are generally found on cold high-elevation sites above the western hemlock series. Mountain hemlock is the dominant overstory tree species, with Sitka spruce and yellowcedar occurring to a lesser degree. The shrub layer is dominated by blueberry. As the alpine (treeless) zone is approached, copperbrush and cassiope become more common. Deer cabbage is a common herb. Plant productivity is limited by the shorter growing season at high elevations and by reduced soil drainage common to some of the associations.

Mixed Conifer Series

Mixed conifer associations designate sites with limited productivity due to poor soil drainage or shallow soil, or both. These plant associations generally occur in the uplands, often near muskegs. Dominant overstory tree species are mountain hemlock, western hemlock, western redcedar, and yellowcedar. Sitka spruce and shore pine can also occur. Blueberry and rusty menziesia are the dominant shrub species; on the southern portion of the CPOW Project Area, salal can also be locally abundant. Dominant herbs vary and include skunk cabbage, five-leaf bramble, deer cabbage, and ferns.

Mixed Conifer associations designate sites with limited productivity.

Western Hemlock-Yellowcedar Series

This series can be considered a subset of the western hemlock series on the Ketchikan Area. It is most common on mountains and hillslopes around 1,000 feet elevation, but can be found from sea level to the subalpine zone. Dominant overstory tree species are western hemlock and yellowcedar; western redcedar may also be present. Blueberry is the dominant shrub, with rusty menziesia common. Dominant herbs vary and include ferns, bunchberry, dogwood, skunk cabbage, and five-leaf bramble. Site productivity is best described as moderate.

Western Hemlock-Western Redcedar Series

This series represents a transition from the less productive, more poorly drained mixed conifer series, to the more productive, better drained western hemlock series. It occurs on a wide variety of landforms, but is most characteristic of rolling hill country, and lower hill- and mountainslopes. Near the northern limit of its range, redcedar growth is limited by light and temperature. Consequently, while it may be found up to 1,000 feet above sea level, it is most common below 500 feet.

The overstory is dominated by western hemlock. Redcedar commonly occupies 10 to 25 percent of the forest canopy. Yellowcedar may also occur. Other species are incidental. The understory is characterized by blueberry, although salal may be locally common on warmer sites below 500 feet elevation. Site productivity is typically low to moderate on rolling hills and moderate to high on hill- and mountainslopes.

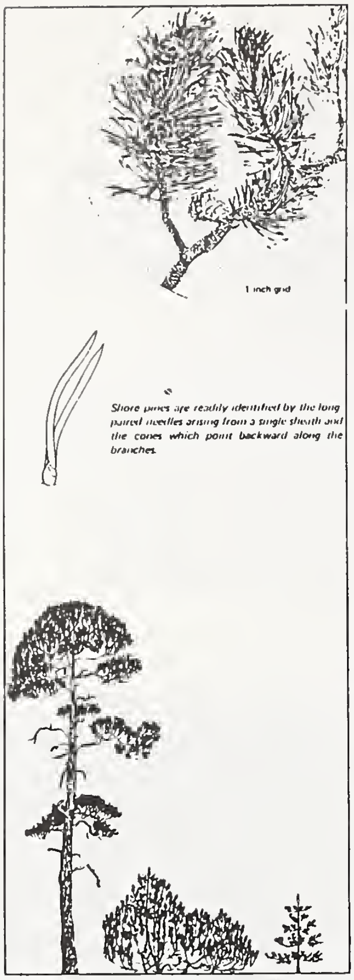
Shore Pine Series

This group of associations is on the transition line from mixed conifer to nonforest muskeg. Soils are poorly drained and productivity is very low. Because of the abundant light available, understory vegetation is very diverse. Muskeg plants such as Labrador tea, crowberry, bog kalmia, bog blueberry, and sedges are common. Salal may occur on some sites.

Nonforest Plant Communities

Various nonforest plant communities occur in estuaries, riparian areas, muskegs, alpine meadows, and alpine lichen rock outcrops in the CPOW Project Area.

Southeast Alaska represents the extreme northern extent of the range for Pacific yew, which has received much national attention as a result of research which indicates it has use in treatment of some forms of cancer. The species tends to be found within 500 feet of saltwater, as it requires the warm marine environment to exist at this



SHORE PINE *Pinus contorta*

latitude. It is not very abundant, and exists in only a limited amount in the CPOW Project Area (some has been reported in the Salt Chuck area).

Nonforest wetlands are described in DeMeo and Loggy (1989). Estuary tidal flats are inundated by high tides. Vegetation consists primarily of sedges, red fescue, and sea milkwort. Bluejoint and sedges dominate on low terraces, which are rarely inundated by tides but have high water tables. This also includes unvegetated mud flats.

Shrub riparian areas are found on highly active floodplains and are frequently disturbed. Soils are generally deep and well drained, but flood frequently. Salmonberry, stinkcurrant, devil's club, and ferns are the dominant vegetation.

Muskegs are most often characterized by stunted yellowcedar and shore pine, along with sedges and other bog vegetation. Muskegs dominated by sphagnum moss or tall sedge cover smaller areas. The water table is at the surface, and numerous small ponds are scattered throughout the muskeg.

Alpine meadows are dominated by cassiope and mixed forbs including mountain heather. These meadows are found on steep, well-drained rock outcrops at high elevation. Alpine lichen rock outcrops are found at high elevations above timberline. Plant cover does not exceed 50 percent. Species diversity is high and includes cassiope, clubmoss, and grass species.

Project Area Timber Distribution

Western hemlock dominates productive, upland timber stands throughout the CPOW Project Area, comprising an average of 65 percent of timber volume. Sitka spruce makes up about 25 percent of the volume in such stands, but predominates in many riparian zones. Cedar species (yellowcedar and western redcedar) make up most of the remaining 10 percent. Red alder may also be present, particularly in areas disturbed by landslides, river actions, or old logging sites and roads.

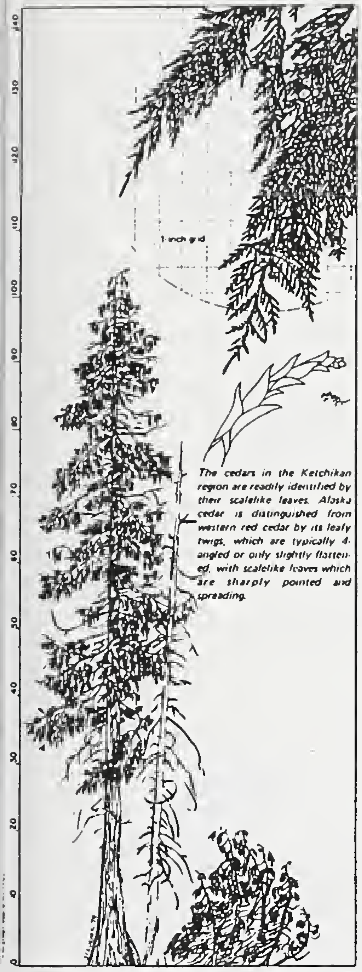
Mountain hemlock and shore pine are common on poorer sites limited by drainage (both) or temperature (mountain hemlock). Historically, they have not provided a major portion of harvested volume, but this should increase as poorer sites are scheduled for logging.

Forest Classification

There are approximately 321,866 acres of land within the CPOW Project Area. Depending on the land ownership and vegetative cover, this land has been categorized as forest land, nonforest land, or other ownership.

Other Ownership

Other ownership refers to lands owned by private individuals, by the State of Alaska, or by Alaskan Native corporations. For the purposes of this document, it also includes lands which have been selected but not conveyed to the State or to Native corporations (see Land Status section of this chapter). About eight percent (25,491 acres) of the land in the CPOW Project Area is in other ownership.



ALASKA CEDAR *Chamaecyparis nootkatensis*

Nonforested

Nonforested means National Forest System land that is biologically unable to support a cover of predominantly timbered vegetation. This includes muskeg, rock out-croppings, talus slopes, and water bodies, among others. About four percent (14,322 acres) of CPOW falls into this category.

Forested

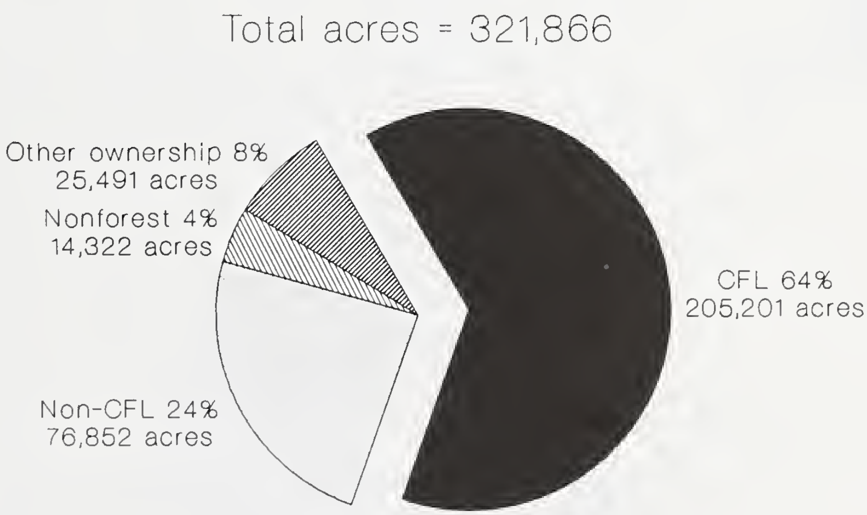
Forested land refers to National Forest System land that consists largely of timbered vegetation; it is further categorized as noncommercial or commercial forest land (CFL).

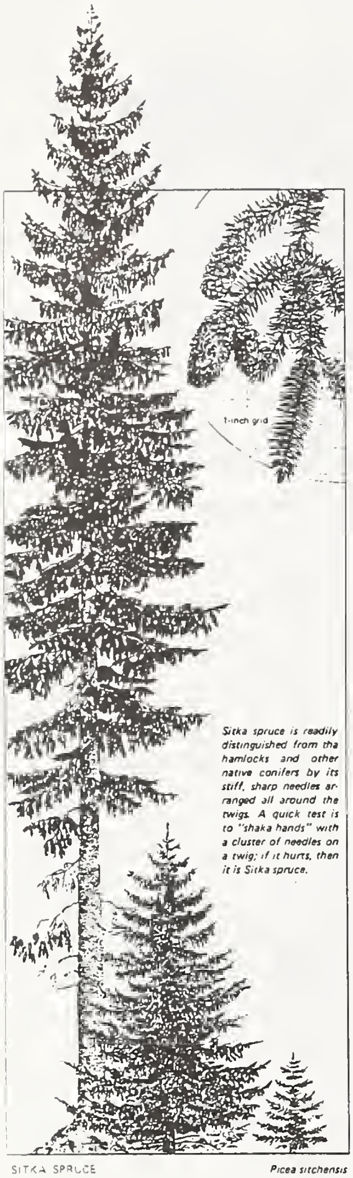
Noncommercial forest land. Noncommercial forest means forested land that doesn't support enough timber volume to meet the criteria for CFL. The CPOW Project Area contains about 24 percent (76,852 acres) of noncommercial forest land.

Commercial forest land (CFL). Commercial forest land means land that is capable of producing continuous crops of timber. The Forest Service has specified that each acre of commercial forest land must be capable of producing 20 cubic feet of tree growth annually or must contain at least eight thousand board feet (MBF) of net timber volume (USDA Forest Service 1978). Old-growth and second-growth stands (younger, even-aged stands that grew after the previous stand was harvested or destroyed by agents such as wind, fire, or insects) may qualify as CFL. The CPOW Project Area contains about 64 percent (205,201 acres) of CFL.

Figure 3-10 shows the breakdown of the various Forest Classifications within the CPOW Project Area.

Figure 3-10
Forest Classifications

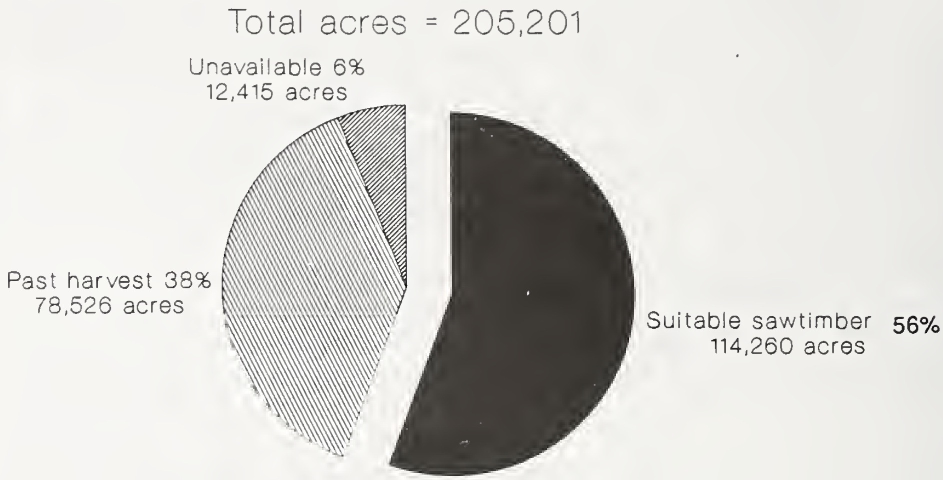




Commercial Forest Land

Commercial forest land may be further subdivided into three categories: unavailable for harvest, previously harvested, and sawtimber available for timber harvest. Figure 3-11 shows this breakdown.

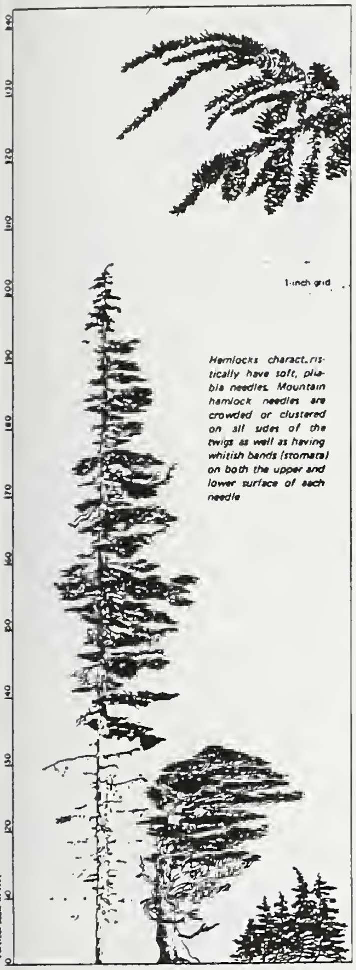
Figure 3-11
Components of CFL



Unavailable for harvest. These lands have been withdrawn from the timber base and include: LUD I, lands associated with Primitive Recreation standards and guidelines of the TLMP Draft Revision (1991a) (see Chapter 1), buffers mandated by the Tongass Timber Reform Act on certain fish-bearing streams, minimum 100-foot buffers around all lakes greater than 10 acres in size, 500-foot buffers around the saltwater shoreline, 1,000-foot buffers around estuaries, and 330-foot buffers around all known eagle nests. Approximately 6 percent of the CFL (12,415 acres) within the Project Area is reserved from timber harvest.

Previously harvested. Previous harvests within the CPOW Project Area have largely used clearcut logging methods. The first extensive timber harvests on Prince of Wales started near Hollis with the inception of the Long-Term Sale Contract in the 1950's. Harvest did not move into the CPOW Project Area until the early 1960's. Because the typical rotation age is approximately 100 years, the previously harvested stands are almost exclusively unavailable for timber harvest during this planning period. Approximately 40 percent of the CFL (78,526 acres) within the CPOW Project Area has been previously harvested. Regeneration of harvested stands usually occurs naturally within three growing seasons following logging. Regenerated stands typically are dense and rapidly growing. These stands will be managed to provide future wood fiber.

Sawtimber available for harvest. The remainder of the CFL is sawtimber available for harvest and includes approximately 114,260 acres. This category represents those lands that have both the biological capability and availability to produce industrial wood products. They are derived from the productive, nonwithdrawn segment of the CFL. To be considered available, the forested land must:



MOUNTAIN HEMLOCK *Tsuga mertensiana*

- not be developed for nonforest uses;
- be capable of harvest with available technology to ensure timber production without irreversible resource damage to soil productivity or watershed conditions; and
- be capable of restocking within five years after final harvest.

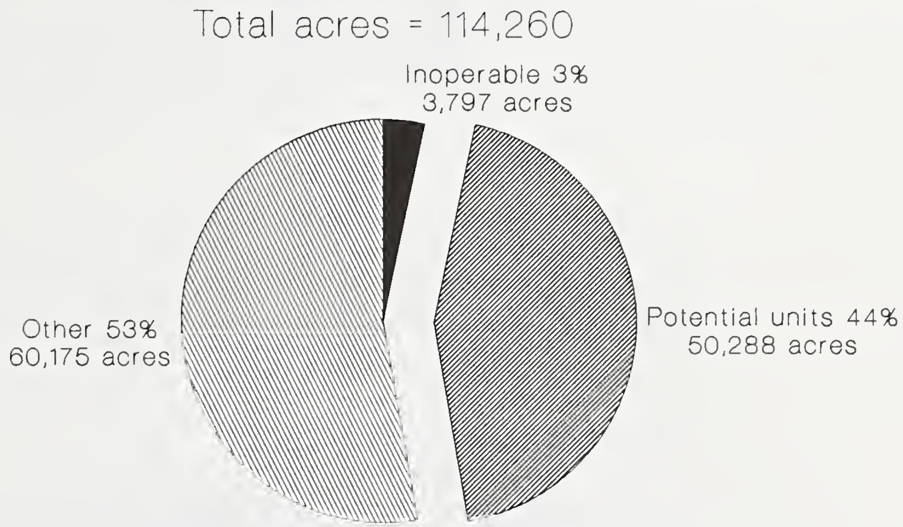
For the purposes of this analysis, to be considered available for harvest, the forested land must also:

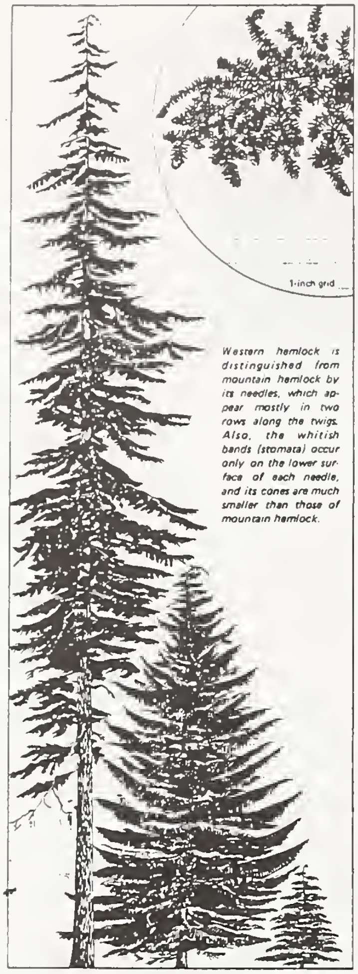
- have sufficient timber volume to qualify within Volume Class 4–7;
- have a Land Use Designation (LUD) that allows commercial timber harvest (LUD III or LUD IV); and
- be suitable-available based on TLMP Draft Revision Alternative P (1991a)

Sawtimber Available for Harvest

In 1992 the Forest Service completed a multi-entry logging plan (MELP) which analyzed all the suitable-available CFL within the CPOW Project Area based on the TLMP Draft Revision Alternative P (1991a) and identified site-specific timber harvest units and supporting road networks. This MELP provided the framework to identify potential units which could support timber harvest operations using available technology and meeting TLMP standards and guidelines (potential units) and those which may not ('other'). Approximately 44 percent (50,288 acres) of the sawtimber available for harvest is comprised of potential units, while 53 percent (60,175 acres) is classified as other and deferred for this project. Field recon showed that 3,797 acres of surveyed potential units would not meet TLMP standards and guidelines if harvested. These areas will be recommended for deletion from the Tongass timber base. The lands in the 'other' category will be examined for harvest in the future as a result of Forest Plan implementation. Field reconnaissance of these areas will make the final determination of their operability status. All the harvest for the CPOW project is proposed to come from the potential units identified in the 1991-92 MELP. Figure 3-12 shows this breakdown for the CPOW Project Area.

Figure 3-12
Components of Sawtimber Available for Harvest





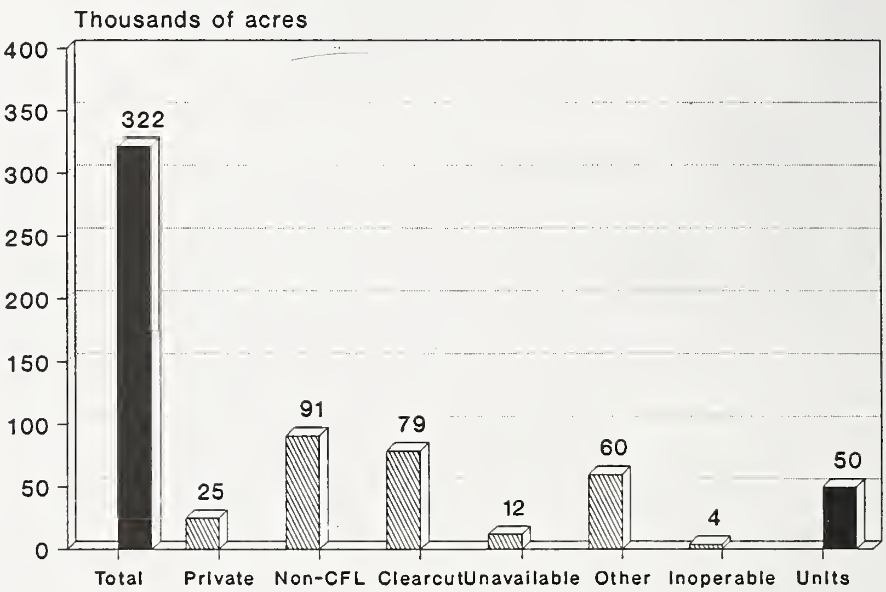
WESTERN HEMLOCK *Tsuga heterophylla*

These 'other' lands (60,175 acres) were defined during the interdisciplinary site-specific unit design, when some land was deferred from consideration for potential harvest units. Reasons these lands were deferred are: unstable soils and oversteepened slopes, poor probability for regeneration, very low volume per acre, non-viable economics due to isolation, not suitable for harvest because of concentrations of streams requiring protection, and too small to form a logical harvest unit.

The inoperable areas (3,797 acres) were identified during recon when site specific areas were determined to not be harvestable within environmental regulations and/or TLMP standards and guidelines. Reasons these lands were considered inoperable include unstable soils and oversteepened slopes (32 percent), fishery habitat (28 percent), cave resources protection (9 percent), and other reasons, including low volume, cultural resources, logging feasibility, and wildlife nesting areas (31 percent).

Figure 3-13 summarizes the classifications of the land base within the CPOW Project Area and shows how the land identified for consideration for timber harvest was identified.

Figure 3-13
Summary of Land Classification



It should be noted that all estimates of timber supply in this section, as well as in this Final EIS as a whole, are based on the TLMP Draft Revision, Alt. P, estimates. This represents a departure from the Draft EIS, where the MELP was used to estimate future timber supply. The TLMP Draft Revision, Alt. P, schedules all (approximately 114,016 of the estimated 114,260 acres) of the sawtimber available for harvest within the Project Area.

Volume Classes

Commercial forest land in the Tongass National Forest has been classified into volume classes. In the 1970's, the Forest Service contracted an independent consulting firm to assign volume per acre for all commercial forest land on the Ketchikan Administrative

WESTERN RED CEDAR *Thuja plicata*

Area based upon extensive aerial photo interpretation, but little fieldwork. This volume-per-acre data was stratified into volume classes, which were designed to represent a range of net sawlog timber volumes per acre. Volume Class 3 is CFL which contains less than eight MBF per acre; examples include unstocked, recently harvested stands and fully stocked, immature stands. Volume classes 4 through 7 contain trees of merchantable size and with more than eight MBF per acre. Table 3-34 displays the volume range for each volume class.

Table 3-34
Timber Volume Range Within Volume Classes

Volume Class	Range of net sawlog volume (MBF/Acre)
4	8 - 20
5	20 - 30
6	30 - 50
7	over 50

The 1989-94 Long-Term Contract EIS (LTS EIS) used silvicultural stand examination information based on 11,714 plots to develop the average volume per acre, by volume class, for each of the three generalized areas which made up the Project Area for that EIS. These three general areas included: 1) Polk Inlet–12 Mile Arm (VCU's 600 and greater), 2) Thorne Bay–Naukati–Coffman Cove (VCU's 552 - 599), and 3) Whale Pass–Labouchere Bay (VCU's 527 - 551). This stand exam data was composed of on-the-ground evaluations of stand characteristics and capabilities; it was incorporated into the Administrative Record for the 1989-94 LTS EIS as items #73 - 75 Stand Exam Information.

These stand exam plots were randomly distributed based on individual stand characteristics, and were neither based on nor concentrated within predefined boundaries for harvest units proposed by the 1989-94 LTS EIS. Consequently, this stand exam data is relevant for the CPOW analysis and is a reasonable predictor of volume per acre by volume class. Table 3-35 displays the net volume per acre (including an estimation of utility volume) by volume class and VCU.

"The average volume-per-acre on a net sawlog plus utility basis in the preferred alternative for CPOW is 26.8 MBF/acre."

Table 3-35
Estimated Average Net Volume Per Acre (Net Sawlog Plus Utility), by Volume Class (VC)

		(MBF/acre)		
VCU Range	VC 4	VC 5	VC 6	VC 7
527 - 551	20.0	29.7	35.5	44.4
552 - 599	21.9	32.8	38.1	50.8
600 and over	26.1	30.6	43.1	58.4

These volume-per-acre figures are used to calculate planned harvest unit volumes from planned acres. The average volume per acre on a net sawlog plus utility basis in the preferred alternative for CPOW is 26.8 MBF/acre. This figure includes reductions in volume yield from non-clearcutting silvicultural practices. For comparison purposes, timber harvest resulting from the 1989-94 EIS has produced approximately 28.5 MBF/acre (Harry Gibson, Tongass National Forest, pers. comm.).

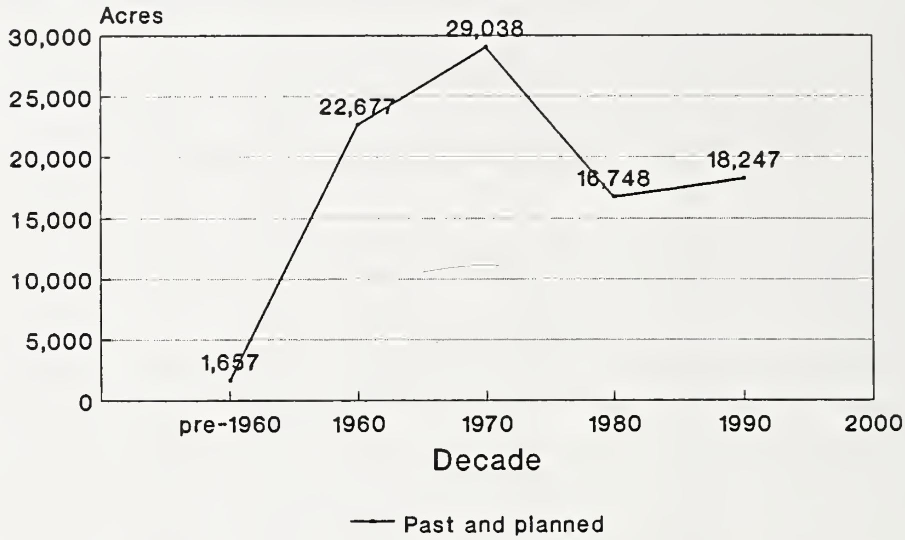
Table 3-36 shows the volume class breakdown of the potential units identified for harvest and an estimate of harvestable volume within the CPOW Project Area by volume class and VCU. The estimated volume assumes all acres are harvested by clearcut. If other silvicultural prescriptions are used, there will be reductions in yield. This table should not be used to estimate timber supply. Timber supply is estimated by the TLMP Draft Revision, Alt. P, which identified approximately 2.8 BBF.

Table 3-36
Potential Units Identified for Harvest, by Volume Class (VC)

VCU	VC 4	VC 5	VC 6	VC 7	Estimated Volume
549.2	604	413	80	0	27,049
550	370	600	297	0	35,783
551	507	159	0	0	14,870
552	1,523	1,054	235	33	71,610
553	1,083	374	41	0	37,129
554.2	274	206	257	271	35,693
557	63	149	311	23	19,269
571	757	657	348	695	86,093
572	349	328	175	95	29,845
573	1,374	2,750	1,233	117	170,109
574	619	909	323	176	63,633
577	643	1,062	289	108	65,301
579	580	520	80	0	32,787
580	553	990	547	2	65,297
581	355	1,453	456	30	74,279
582	183	290	152	179	28,393
583	669	1,059	415	86	69,176
584	1,272	1,499	338	38	90,524
585	706	401	28	0	28,886
586	79	128	40	34	9,176
587.1	332	305	112	39	23,231
588	1,124	2,272	1,013	307	151,001
589	1,110	1,738	42	19	83,833
590	253	732	519	0	47,439
593	22	77	0	0	3,005
598	841	509	364	14	49,658
599	281	427	92	0	23,648
TOTAL	16,526	21,061	7,787	2,266	1,436,986

Most of the timber harvested to date within the CPOW Project Area has been from old-growth stands. Occasionally, second-growth stands originating from previous wind or landslide disturbance have been harvested. For this Final EIS, a new GIS second-growth layer is used which was developed for the KPC 'as-built' appraisal. This new layer indicates a reduction in previously identified harvest acres from 81,709 to 78,526 acres and incorporates new delineations of past harvest units from the 1991 aerial photos, as well as reduced size of units from the 1989-94 LTS EIS. A summary of the timber acreage previously harvested to date in the CPOW Project Area is provided in Table 3-37, later in this section. Figure 3-14 shows the decadal harvest within the CPOW Project Area. Harvest for the 1990's assumes the remainder of 1989-94 units and CPOW Alt. F5 are harvested.

Figure 3-14
Decadal Harvest for Total CPOW Project Area



Since 1976, regeneration (the process of establishing a new crop of trees on the harvested land) has been certified by a silviculturist in the Tongass National Forest. Regeneration of a harvest unit is certified when it is adequately stocked with healthy young trees. The site is examined three years after harvest to determine if natural regeneration is progressing adequately or if artificial regeneration is required to restock the site. All sites are certified as restocked by the fifth growing season after harvest as required under NFMA, or additional regeneration activities must be scheduled. In the Alaska Region, this adequate stocking level is considered to be at least 300 trees per acre. These trees need to be healthy, of a commercial species, and at least 4 inches tall for areas that regenerate naturally, or between 4 inches and 14 inches tall for areas that are planted. In addition, at least 60 percent of the stand must meet those minimum conditions. On the Tongass, these minimum stocking requirements are achieved in three to five years following timber harvest.

To be considered as having met another NFMA requirement of dispersion (i.e., having progressed from the clearcut opening to fully established stand), the average tree height of the regenerated stand must be at least five feet. This new stand of trees usually regenerates by natural seeding, and will normally attain a height of five feet within 5 to 10 years after harvest. For the purposes of this project, the average age to attain a five-foot height is considered to be 8 years, with 3 years estimated for establishment of the seedlings and one foot of leader growth per year. Additional time

may be required for the second growth to meet the size and stocking requirement necessary to achieve other resource objectives, such as visual quality objectives.

In the CPOW Project Area, there has been extensive precommercial thinning of regenerated stands by selectively removing trees. This thinning operation is usually scheduled when the new stand is 15–25 years old and reduces competition among trees in the stand, causing the remaining trees to increase in diameter faster than under unthinned conditions.

Thinning in second-growth stand.

Effects of the Alternatives

Direct and Indirect Effects

MELP, and Design Criteria

As mentioned earlier, in 1992 the Forest Service completed a multi-entry layout plan (MELP) for the CPOW Project Area which tentatively identifed potential harvest units and associated roads in the CFL. In April 1992, the IDT expanded the MELP to include harvest and transportation design for areas excluded from the original MELP. These additional areas included previously mapped old growth and extended rotation areas designated by the 1989-94 LTS EIS which lay either within the large, unfragmented blocks of old-growth forest within Honker Divide and Staney Creek or else within the Scenic Viewshed areas designated by the TLMP Draft Revision. This expanded 1991-92 MELP forms the basis for units to be considered for this project.

Prior to development of this MELP, design criteria were developed by the Interdisciplinary Team (Appendix C). These design criteria were developed to minimize potential impacts to all resources and were adhered to during preliminary harvest unit and road location, evaluation and selection of proposed harvest units and roads, and final harvest unit and road design. Following are discussions of the acres of forested land harvested, the effects of silvicultural systems and timber harvest methods on long-term productivity, and timber economic considerations. Also included is a discussion of Volume Class 6 and 7 proposed for harvest by alternative. The effects of timber harvest on mature and over-mature stands are considered long term and are discussed later in this section.

Timber Harvested

Tables 3-37 through 3-43 show the acres proposed for harvest, by VCU, in each action alternative. Also shown in these tables are total percentages of available sawtimber, commercial forest land (CFL), and overall land area harvested by the end of this project. All units proposed for harvest have been determined to be suitable and operable (FSH 1909.12).

While all action alternatives propose to harvest the same approximate volume, Alternative F5 harvests more acres (9,836) because it relies more heavily on silvicultural systems other than clearcutting. In contrast, Alternative F4 proposes to harvest the fewest acres (9,180). Alternative 1a proposes cancellation of 994 acres of harvest for the Long-Term Contract, as well as 25 acres of independent harvest; it proposes no new harvest. Alternative 1 proposes no new harvest and thus would not increase the number of acres harvested. Because of the similarity of proposed harvest levels in all action alternatives, 43 percent of the available CFL, and 30 percent of the total National Forest System land base within the Project Area will have been harvested during the first 42 years of the Long-Term Contract with KPC.

Table 3-37
Acres of Forested Land Harvested for Alternative 1, by VCU

VCU	Past Harvest (Acres)	Proposed Harvest (Acres)	Total 1996 Harvest (Acres)	1996 Percent Harvested CFL	Total Area
538	528	0	528	NA	NA
549	1,137	0	1,137	31	16
550	3,983	0	3,983	55	37
551	80	0	80	4	2
552	657	0	657	10	8
553	0	0	0	0	0
554	2,993	0	2,993	51	34
557	2,240	0	2,240	75	70
571	5,061	0	5,061	47	30
572	1,591	0	1,591	41	21
573	3,505	0	3,505	20	13
574	3,456	0	3,456	33	25
577	4,173	0	4,173	41	31
579	3,741	0	3,741	56	35
580	2,335	0	2,335	25	15
581	6,164	0	6,164	46	31
582	7	0	7	0	0
583	3,508	0	3,508	42	29
584	3,523	0	3,523	37	26
585	4,605	0	4,605	62	44
586	3,742	0	3,742	66	24
587	2,634	0	2,634	38	34
588	9,983	0	9,983	49	37
589	2,918	0	2,918	23	15
590	3,408	0	3,408	36	25
593	0	0	0	NA	NA
598	2,401	0	2,401	29	19
599	78	0	78	NA	NA
600	0	0	0	NA	NA
601	75	0	75	NA	NA
Total	78,526	0	78,526	38	24

Table 3-38
Acres of Forested Land Harvested for Alternative 1a, by VCU

VCU	Past Harvest (Acres)	Proposed Harvest (Acres)	Total 1996 Harvest (Acres)	1996 Percent Harvested CFL	Total Area
538	528	0	528	NA	NA
549	1,137	0	1,137	31	16
550	3,983	0	3,983	55	37
551	80	0	80	4	2
552	657	0	657	10	8
553	0	0	0	0	0
554	2,993	0	2,993	51	34
557	2,240	0	2,240	75	70
571	5,061	0	5,061	47	30
572	1,591	0	1,591	41	21
573	3,505	0	3,505	20	13
574	3,456	0	3,456	33	25
577	4,173	0	4,173	41	31
579	3,741	0	3,741	56	35
580	2,335	0	2,335	25	15
581	6,164	0	6,164	46	31
582	7	0	7	0	0
583	3,508	-203	3,305	40	27
584	3,523	-462	3,061	32	23
585	4,605	0	4,605	62	44
586	3,742	0	3,742	66	24
587	2,634	0	2,634	38	34
588	9,983	0	9,983	49	37
589	2,918	- 76	2,842	22	15
590	3,408	-253	3,155	33	23
593	0	0	0	NA	NA
598	2,401	- 25	2,376	29	19
599	78	0	78	NA	NA
600	0	0	0	NA	NA
601	75	0	75	NA	NA
Total	78,526	0	77,532	38	24

Table 3-39

Acres of Forested Land Harvested for Alternative F2, by VCU

VCU	Past Harvest (Acres)	Proposed Harvest (Acres)	Total 1996 Harvest (Acres)	1996 Percent Harvested CFL	Total Area
538	528	0	528	NA	NA
549	1,137	0	1,137	31	16
550	3,983	293	4,276	60	40
551	80	33	113	6	2
552	657	0	657	10	8
553	0	355	355	11	5
554	2,993	103	3,096	53	35
557	2,240	46	2,286	77	72
571	5,061	704	5,765	53	35
572	1,591	185	1,776	46	23
573	3,505	484	3,989	23	15
574	3,456	221	3,677	35	27
577	4,173	346	4,519	45	33
579	3,741	723	4,464	67	42
580	2,335	425	2,760	29	18
581	6,164	316	6,480	49	32
582	7	195	202	8	5
583	3,508	446	3,954	47	32
584	3,523	624	4,147	43	31
585	4,605	289	4,894	66	47
586	3,742	479	4,221	75	28
587	2,634	292	2,926	42	37
588	9,983	1,626	11,609	57	44
589	2,918	40	2,958	23	15
590	3,408	773	4,181	44	30
593	0	0	0	NA	NA
598	2,401	375	2,776	41	21
599	78	0	78	NA	NA
600	0	0	0	NA	NA
601	75	0	75	NA	NA
Total	78,526	9,373	87,899	43	27

Table 3-40
Acres of Forested Land Harvested for Alternative F3, by VCU

VCU	Past Harvest (Acres)	Proposed Harvest (Acres)	Total 1996 Harvest (Acres)	1996 Percent Harvested CFL	Total Area
538	528	0	528	NA	NA
549	1,137	117	1,254	34	18
550	3,983	475	4,458	62	42
551	80	160	240	13	5
552	657	629	1,286	20	16
553	0	320	320	10	4
554	2,993	204	3,197	54	36
557	2,240	46	2,286	77	72
571	5,061	666	5,727	53	34
572	1,591	232	1,823	47	24
573	3,505	862	4,367	25	17
574	3,456	159	3,615	34	26
577	4,173	498	4,671	46	34
579	3,741	586	4,327	65	40
580	2,335	246	2,581	27	17
581	6,164	188	6,352	48	32
582	7	149	156	6	4
583	3,508	203	3,711	45	30
584	3,523	335	3,858	40	29
585	4,605	318	4,923	66	47
586	3,742	411	4,153	74	27
587	2,634	292	2,926	42	37
588	9,983	1,365	11,348	56	43
589	2,918	316	3,234	25	16
590	3,408	128	3,536	37	26
593	0	0	0	NA	NA
598	2,401	614	3,015	36	23
599	78	0	78	NA	NA
600	0	0	0	NA	NA
601	75	0	75	NA	NA
Total	81,709	9,519	88,045	43	27

Table 3-41
Acres of Forested Land Harvested for Alternative F4, by VCU

VCU	Past Harvest (Acres)	Proposed Harvest (Acres)	Total 1996 Harvest (Acres)	1996 Percent Harvested CFL	Total Area
538	528	0	528	NA	NA
549	1,137	117	1,254	34	18
550	3,983	355	4,338	60	41
551	80	33	113	6	2
552	657	0	657	10	8
553	0	0	0	0	0
554	2,993	204	3,197	54	36
557	2,240	46	2,286	77	72
571	5,061	600	5,661	52	34
572	1,591	185	1,776	46	23
573	3,505	281	3,786	21	15
574	3,456	156	3,612	34	26
577	4,173	422	4,595	46	34
579	3,741	586	4,327	65	40
580	2,335	464	2,799	30	18
581	6,164	229	6,393	48	32
582	7	46	53	2	1
583	3,508	423	3,931	47	32
584	3,523	541	4,064	42	30
585	4,605	289	4,894	66	47
586	3,742	492	4,234	75	28
587	2,634	292	2,926	42	37
588	9,983	1,626	11,609	57	44
589	2,918	425	3,343	26	17
590	3,408	692	4,100	43	30
593	0	0	0	NA	NA
598	2,401	676	3,077	37	24
599	78	0	78	NA	NA
600	0	0	0	NA	NA
601	75	0	75	NA	NA
Total	78,526	9,180	87,706	43	27

Table 3-42
Acres of Forested Land Harvested for Alternative F5, by VCU

VCU	Past Harvest (Acres)	Proposed Harvest (Acres)	Total 1996 Harvest (Acres)	1996 Percent Harvested CFL	Total Area
538	528	0	528	NA	NA
549	1,137	117	1,254	34	18
550	3,983	238	4,221	59	40
551	80	0	80	4	2
552	6578	0	657	10	8
553	0	0	0	0	0
554	2,993	204	3,197	54	36
557	2,240	46	2,286	77	72
571	5,061	733	5,794	53	35
572	1,591	159	1,750	45	23
573	3,505	334	3,839	22	15
574	3,456	156	3,612	34	26
577	4,173	474	4,647	46	34
579	3,741	785	4,526	68	42
580	2,335	493	2,828	30	18
581	6,164	290	6,454	49	32
582	7	195	202	8	5
583	3,508	448	3,956	47	32
584	3,523	512	4,035	42	30
585	4,605	289	4,894	66	47
586	3,742	470	4,212	75	28
587	2,634	292	2,926	42	37
588	9,983	1,765	11,748	58	44
589	2,918	696	3,614	28	18
590	3,408	773	4,181	44	30
593	0	0	0	NA	NA
598	2,401	367	2,768	33	21
599	78	0	78	NA	NA
600	0	0	0	NA	NA
601	75	0	75	NA	NA
Total	78,526	9,836	88,362	43	27

Table 3-43
Acres of Forested Land Harvested for Alternative F6, by VCU

VCU	Past Harvest (Acres)	Proposed Harvest (Acres)	Total 1996 Harvest (Acres)	1996 Percent Harvested CFL	Total Area
538	528	0	528	NA	NA
549	1,137	74	1,211	33	18
550	3,983	44	4,027	56	38
551	80	33	113	6	2
552	6578	33	690	11	8
553	0	37	37	1	0
554	2,993	80	3,073	52	35
557	2,240	0	2,240	75	70
571	5,061	486	5,547	51	33
572	1,591	232	1,823	47	24
573	3,505	651	4,156	24	16
574	3,456	174	3,630	34	27
577	4,173	463	4,636	46	34
579	3,741	785	4,526	68	42
580	2,335	277	2,612	28	17
581	6,164	288	6,452	49	32
582	7	195	202	8	5
583	3,508	446	3,955	47	32
584	3,523	572	4,095	43	30
585	4,605	71	4,676	63	45
586	3,742	589	4,331	77	28
587	2,634	239	2,823	42	37
588	9,983	1,652	11,635	58	44
589	2,918	776	3,694	29	18
590	3,408	773	4,181	44	30
593	0	0	0	NA	NA
598	2,401	375	2,776	33	21
599	78	0	78	NA	NA
600	0	0	0	NA	NA
601	75	0	75	NA	NA
Total	78,526	9,345	87,871	43	27

Harvest by Plant Series

Timber harvest activities would affect forested plant communities but would have little or no effect on nonforest plant communities, with the exception of short road segments which may cross nonforested areas. The short-term effect on vegetation in the CPOW Project Area resulting from timber harvest would be the conversion of old-growth climax forest types to younger, faster-growing successional stands. This will result in a long-term increase in the production of total wood fiber. The removal of the forest overstory would change the microsite conditions that had influenced the species composition and density of the understory vegetation. Species that thrive best in the shaded and protected environment under the mature forest (such as mosses, lichens, herbs, and some shrubs) would find themselves without the beneficial influence of the trees and be reduced in vigor or competitive ability. Some species survive in the understory, but when released from the influence of the mature overstory become vigorous competitors for growth space; these species include salmonberry, huckleberry and western hemlock. Other species that don't thrive in the shaded conditions under the mature forest canopy (notably Sitka spruce, Western redcedar, and yellowcedar), do well in open, full sunlight conditions. Table 3-44 shows the acres of proposed harvest for each major plant series found within the CPOW Project Area by alternative.

Table 3-44
Acres of Proposed Harvest by Major Plant Series, by Alternative

Alternative	Western Hemlock	Sitka Spruce	Mixed Conifer	Cedar*	Total
1, 1a	0	0	0	0	0
F2	6,876	104	2,150	243	9,373
F3	7,367	58	1,826	268	9,519
F4	6,893	104	1,934	249	9,180
F5	7,195	104	2,338	199	9,839
F6	6,827	85	2,146	287	9,345

* Refers to Western Hemlock-Western Redcedar Series.

Western hemlock is the most widely harvested plant series in all action alternatives, ranging in harvest from 6,827 acres to 7,367 acres. The successional changes which occur in the forest after harvest are described in a later section.

Silvicultural Systems

The names given to silvicultural systems describe the type of regeneration harvest used to replace the existing stand. Silvicultural systems are grouped into even-aged and uneven-aged, depending on the age structure created by regeneration harvest. Both even- and uneven-aged management are approved for use in the CPOW Project Area, depending on specific resource needs (USDA Forest Service 1983). Examples of even-aged management include clearcutting, shelterwood, and seed tree; all even-age systems are designed to replace the entire stand at the same time. An example of uneven-aged management is selective harvest; this system is used to replace only a portion of the stand, while preserving the remainder. All of these examples are utilized in CPOW proposed harvest units. The unit cards in Appendix G summarize the silvicultural prescription.

On June 4, 1992, the Chief of the Forest Service issued national direction on reduced use of clearcutting (Robertson 1992). His stated objective is, "to reduce clearcutting on National Forest System lands and make greater use of individual tree selection, group selection, green tree retention, shelterwood, seed tree, and other regeneration cutting methods which collectively provide for a more pleasing and diverse vegetative appearance on a forest-wide basis."

According to the Chief's direction letter, this policy would "reduce clearcutting where it has been used as a standard timber harvest practice on national forests. Clearcutting would be limited to areas where it is essential to meet forest plan objectives and involve one or more of the following circumstances:

1. To establish, enhance, or maintain habitat for threatened, endangered, or sensitive species.

2. To enhance wildlife habitat or water yield values, or to provide for recreation, scenic vistas, utility lines, road corridors, facility sites, reservoirs, or similar developments.

3. To rehabilitate lands adversely impacted by events such as fires, windstorms, or insect or disease infestations.

4. To preclude or minimize the occurrence of potentially adverse impacts or insect or disease infestations, windthrow, logging damage, or other factors affecting forest health.

5. To provide for the establishment and growth of desired trees or vegetative species that are shade intolerant.

6. To rehabilitate poorly stocked stands due to past management practices or natural events.

7. To meet research needs."

The Chief's letter further notes that, "This clearcutting policy combined with the new USDA Forest Service ecosystem management emphasis can reduce clearcutting by as much as 70 percent from FY 1988 levels. The reduction in timber volume over the short run is likely to be about 10 percent. There would be little reduction in timber volume over the long term. There will be increases in timber sale costs and some areas will not be harvested because local timber industries do not have appropriate logging equipment to use other methods on steep slopes. However, judicious use of alternative harvest methods can be subsituted for clearcutting on most areas of the National Forests."

Clearcutting, an even-aged silvicultural system, has long been recommended as the basic silvicultural system for hemlock-spruce forests. It leads to adequate natural regeneration, is economical, and is appropriate for old-growth stands with large, defective timber. Clearcutting allows more sunlight to reach the forest floor, which increases the decomposition of heavy organic accumulations and the recycling of nutrients. Clearcutting disturbs less area for a given amount of timber harvested than does partial cutting. For example, for a project the size of CPOW, the volume of 290 MMBF associated with the stated purpose and need of the project could be harvested from approximately 10,000 acres by clearcut logging, but would require approximately 20,000–30,000 acres to yield the same volume if partial cutting were employed.

Clearcutting is the most effective means of eliminating dwarf-mistletoe (a disease which causes growth loss and is common to hemlock/spruce forests). Partial cutting could allow mistletoe-diseased standing trees to infect the newly regenerated stand. Also, where shallow-rooted tree species, shallow soils, and exposure to the effects of severe weather conditions contribute to windthrow, clearcutting is an effective silvicultural system. Precluding or minimizing disease and windthrow are specifically mentioned in #4 of the Chief of the Forest Service's letter on reduction of clearcutting (see above). Clearcutting also tends to provide a higher percentage of Sitka spruce regeneration, because spruce regenerates better in full sunlight than other Southeast Alaska species (Harris and Farr 1974). This is desirable because Sitka spruce is an economically preferred species. Providing for the establishment and growth of desired tree species is specifically mentioned in #5 of the Chief of the Forest Service's letter on reduction of clearcutting (see above). Based on these reasons, clearcutting is considered the optimal method to harvest standing timber in the CPOW Project Area.

There are some disadvantages to clearcutting. Sometimes the distribution of seed is uneven, which leaves some areas overstocked and other areas understocked. Clearcutting is the least aesthetically desirable system. It can also increase the risk of blowdown where the cutting unit boundaries are against standing, mature timber. Finally, it is more difficult to control which species will regenerate; the cedars are particularly ill-suited to regenerating in clearcuts.

There were some units where the CPOW IDT wanted even-aged management but needed a system other than clearcutting. Some units were prescribed for shelterwood harvest (an estimated 70 percent of the existing volume removed) and a few for seed tree harvest (an estimated 90 percent of the existing volume removed), as discussed under Regeneration, later in this section. This will allow evaluation of the success of alternate silvicultural systems, addressing the recent directive from the Chief of the Forest Service to reduce the national use of clearcutting and to restrict its use to situations where it provides the optimal silvicultural treatment.

The CPOW Interdisciplinary Team identified harvest units that are potentially more suitable for uneven-aged management, in order to achieve other resource objectives. The two scenarios where this was employed were timber harvest (1) where clearcutting would not meet visual management objectives (VQO's) (an estimated 70 percent of the existing volume removed), and (2) where riparian management objectives required maintenance of a mature timber stand component (an estimated 60 percent of the existing volume removed). If these units are prescribed for true uneven-aged management, they will utilize a form of group selection, which may remove less of the estimated volume. To remove the estimated volume percentages, they may follow a shelterwood harvest with reserve trees. In either case, their implementation is limited to helicopter yarding or to short span uphill cable logging, where logs can be controlled during yarding to minimize damage to residual stands. Based on experience, logging costs for partial cutting typically run 20 to 50 percent higher than costs for clearcutting. However, by using this silvicultural system, harvest units may be partially harvested which would otherwise be unacceptable for clearcutting because of other resource concerns. In addition, partial cuts may be used to enhance other resources such as wildlife.

Unit 581-204-B is prescribed for uneven-aged management for visuals, while the following units are prescribed for uneven-aged management for riparian management, per TLMP Draft Revision, Alt. P, land-use designation:

549.2-201	583-258
553-219	585-201
553-228	585-203
553-239	585-204
554.2-225	585-206
571-252	587.1-209
573-239	588-212
573-241	588-213
573-297	588-215
573-314	590-231
577-284	

Alternative F5 proposes an ecosystem management approach for timber harvest in the Sarkar Lakes area. Objectives have been established for an 'end product' for the stand structure of each unit after harvest. A certified silviculturist will write the prescription to implement the objectives, which may range from individual tree harvest to clearcut. For analysis in this EIS, it is estimated that 30 percent of the volume in each unit will be harvested.

The following units are included within this ecosystem management approach in Alternative F5:

Unit	Objective
549.2-201	Riparian habitat, soil protection
549.2-205	Wildlife habitat integrated with timber production
549.2-206	Goshawk foraging area and other objectives to be identified by District IDT
549.2-230	Goshawk foraging area and other objectives to be identified by District IDT
549.2-200	Karst management and protection
549.2-201	Goshawk foraging area and other objectives to be identified by District IDT
554.2-210	Goshawk foraging area and other objectives to be identified by District IDT
554.2-213	Goshawk foraging area and other objectives to be identified by District IDT
554.2-215	Goshawk foraging area and other objectives to be identified by District IDT
554.2-220	Goshawk foraging area and other objectives to be identified by District IDT
554.2-225	Riparian management/soil protection
557-200B	Visual/Karst/Cultural management and protection
571-235	Karst management and protection
571-252	Riparian management/soil protection
571-253	Goshawk foraging area and other objectives to be identified by District IDT
571-266	Karst management and protection
571-267	Karst management and protection
571-268	Goshawk foraging area and other objectives to be identified by District IDT

Monitoring of the effectiveness and implementation of these prescriptions will provide feedback for future projects of this type.

Proposed Harvest Methods

Yarding is the process of moving logs from the stump to a landing. This can be done using ground-based equipment, cable logging systems, or helicopters. The method used depends upon many factors including access, topography, slope, and resource protection needs.

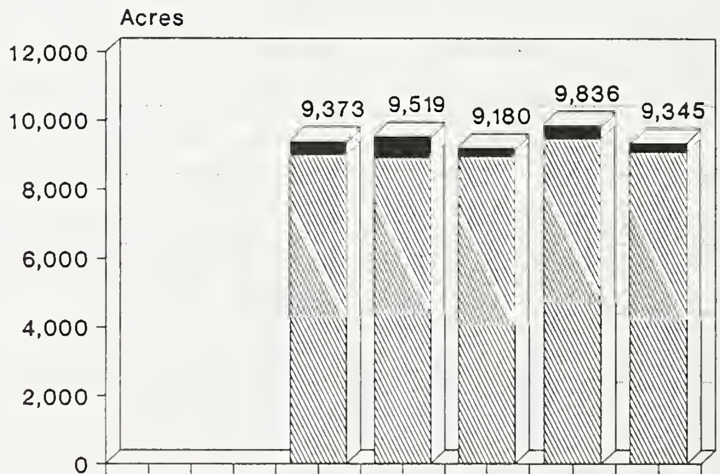
Moist and soft soils along with steep slopes in the CPOW Project Area are difficult for operation of ground-based equipment, and except for shovel logging with track-mounted log loaders, there has been little opportunity for use of this type of equipment. Shovel logging is a fairly new yarding system of moving logs with the boom of a hydraulic log loader. The objective is to use the swing boom of the loader to place logs into windrows, then successively move the windrows closer to a road or landing.

With shovel logging, logs are moved with a hydraulic log loader.

The major impact associated with shovel logging results from the track system of the log loader compacting the soil. The degree of soil compaction is influenced by soil type and the prevailing moisture conditions, but is mitigated by the loader's ability to gather in woody debris and form a 'travel mat' on which to operate. Shovel logging is the most problemmatic on poorly drained soils with parent organic material. Much of the impact on soil compaction can be eliminated when the loader is operating on slash or deep organic accumulations. In many instances, shovel logging will have less impact on the soil than conventional highlead logging, because that yarding system is unable to achieve front end lift.

Because shovel yarding is usually limited to slopes of less than 20 percent, portions of proposed units may be potentially suited for shovel logging but are tentatively planned for cable logging until harvest unit layout makes the final determination possible. Office and field recon had identified specific shovel yarding areas within proposed harvest units. These have been evaluated by a soils scientist are shown on the unit cards. In addition, the timber economics evaluation (later in this section) have costed these specific areas for shovel yarding. Figure 3-15 shows these acres of shovel yarding potential.

Figure 3-15
Acres of Shovel Yarding Potential



	Altn F1	Altn F1A	Altn F2	Altn F3	Altn F4	Altn F5	Altn F6
Shovel yarding	0	0	371	617	229	374	262
Other harvest	0	0	9,002	8,902	8,951	9,462	9,083


Helicopter logging

Helicopter yarding is relatively new to the Ketchikan Area. Logs are lifted off the ground and flown to landings, up to a mile from the harvest unit. In most cases there will be no new road construction associated with helicopter yarding. This yarding system causes the least amount of impact to the soil but has the highest yarding cost. It also provides maximum control of the logs during yarding and is the system best adapted for silvicultural techniques other than clearcutting. Because of its expense, helicopter yarding is usually restricted to areas where it is extremely difficult or expensive to construct roads or where the associated impacts of convential cable yarding systems would violate Forest Service standards and guidelines. Helicopter yarding is proposed to play a major role in all alternatives, except for Alternative F3 (there is no proposed helicopter yarding in this alternative).

Highlead and skyline systems (rigged live or running) account for the majority of the timber harvest in each alternative. Highlead logging, while a relatively inexpensive logging system, provides the least opportunity for suspension or lateral control of the logs while enroute to the landing. Small skyline systems can provide log suspension and, when rigged with a slack-pulling carriage, lateral yarding capabilities.

Slackline systems are employed where a larger tower is needed to achieve log suspension requirements and to provide greater lateral yarding capability. Generally, these larger towers (90–110 feet) require larger landing sizes, greater tailhold and guy anchor strength, and, in some cases, wider turn radius on the roads. Within the CPOW Project Area, adequate tailhold strength frequently limits the use of slackline yarding.

According to the data in Table 3-51, later in this section, small skyline is the least expensive, followed by highlead, slackline, and helicopter. For the cable-based yarding systems, uphill yarding is generally less expensive than downhill. The CPOW IDT planned for the least expensive harvest system which would meet resource objectives. Field recon identified areas where higher levels of resource protection or pure logging feasibility necessitated more sophisticated, expensive yarding systems. Field recon recommendations were incorporated into the MELP.

Table 3-45 displays the distribution of proposed yarding systems for the action alternatives.

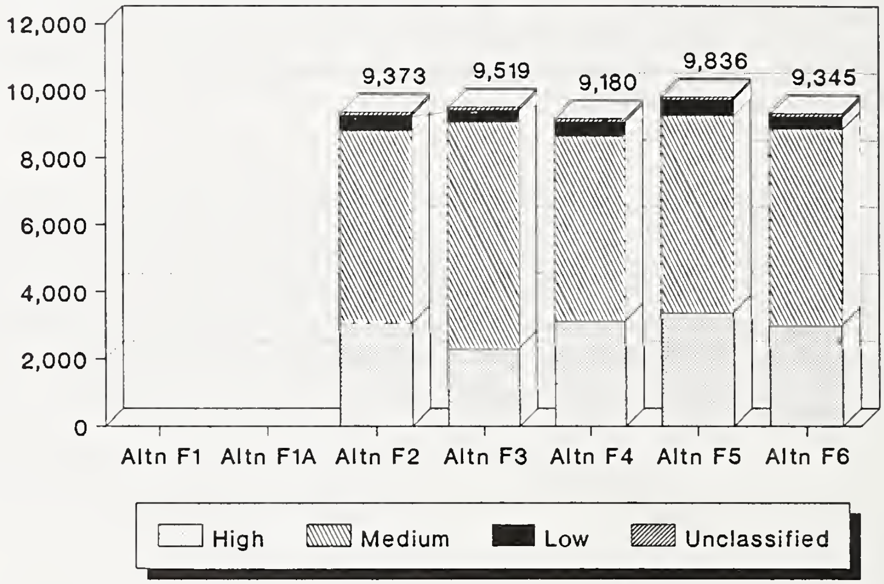
Table 3-45
Distribution of Proposed Harvest System, by Alternative, in MMBF

Alternative	Highlead	Small Skyline	Slackline	Helicopter
1	0	0	0	0
1a	0	0	0	0
F2	67	100	36	60
F3	88	134	38	0
F4	73	91	36	57
F5	72	85	38	69
F6	67	84	34	74

Proposed Harvest by Site Class

Because some sites are more productive than others, they are rated by a site index and assigned a site class of low, medium, or high. The site index is based on the expected height to which a tree will grow on that site within a given number of years (in this case, 50 years). On low sites, trees would be expected to grow between 50 to 69 feet in 50 years. On medium sites, trees would be expected to grow between 70 to 89 feet in 50 years, and on high sites trees would achieve a height greater than 90 feet in 50 years. In general, more timber can be grown at less cost on a high site than on a medium or low site. Because logging costs also tend to be less for the more productive sites, the economic implication is to concentrate timber harvest on the stands with high site indices. However, by harvesting a mixture of site classes, average timber management and logging costs can be developed which allow economically viable harvest of the less productive sites. This harvest mixture allows more low site class land to be managed for timber production. Figure 3-16 shows the acres of proposed harvest by site class and by alternative.

Figure 3-16
Acres of Proposed Harvest by Site Class



In all action alternatives, the majority of the harvest (60–71 percent) is proposed to come from sites of medium productivity. Highly productive sites account for 24–34 percent of the proposed harvest, while sites of low productivity and currently unclassified sites make up the rest of the harvest.

Proportion of Volume Class 6 and 7 Proposed for Harvest

The Tongass Timber Reform Act of 1990 modified the Long-Term Contract to:

> "Eliminate the practice of harvesting a disproportionate amount of old-growth timber by limiting the volume harvested over the rotation in Volume Classes 6 and 7, as defined in TLMP and supporting documents, so that the proportion of volume harvested in these classes within a contiguous management area does not exceed the proportion of volume currently represented by these classes within the management area."

"The TTRA proportionality requirement is based upon volume actually harvested, as opposed to volume scheduled or planned for harvest."

Forest Service Handbook 2409.18, Supplement 92-5, contains the procedure to follow for calculating proportionality. The baseline for proportionality was established with the signing of TTRA into law (November 1990). Volume class determination for proportionality is based on net sawlog inventory volume class, as determined from the Ketchikan Area's GIS timber type map, per Forest Service Handbook direction. It is important to note that the TTRA proportionality requirement is based upon volume actually harvested, as opposed to volume scheduled or planned for harvest. Consequently the measure of compliance will occur after the timber harvest for a given management area is actually completed and based upon the timber type map. The Forest Service Handbook provides the flexibility for temporary departures in proportionality of up to -0.5 percent, if the following conditions are met: (1) there is sufficient volume for a subsequent entry in the Management Area, (2) the future offering is economically feasible, (3) the future offering can meet the original proportionality standard, and (4) allowances are made for salvage harvest due to catastrophic conditions.

For the purpose of this analysis, proportionality calculations considered all long-term harvest which occurred from the TTRA date (11/90) until the date the database was frozen (April 19, 1993) plus all harvest proposed for this project.

There are some changed conditions which should be noted. First, the proportionality percentages published in the Forest Service Handbook (FSH) were based upon the Management Areas as depicted in the TLMP Draft Revision (1991). It has been determined that the intent of TTRA was to use the Management Areas as depicted in the existing TLMP (1979). The proportionality base percentages have been adjusted in this analysis to reflect this change, as an Interim Directive to the FSH.

Second, the updated second-growth layer developed for the 1989-94 'as-built' appraisal was used to best determine the volume class composition of the 1989-94 units in their as-harvested configuration. Based on this analysis, one of the Management Areas in the CPOW Project Area (K03) temporarily exceeds the -0.5 percent proportionality departure allowed in the FSH. This analysis assumes that one of the laid-out (but as yet unreleased) 1989-94 harvest units (531-116) will be withheld from release to KPC.

Third, although approximately 22,000 acres of K03 are within the CPOW Project Area, the bulk of this Management Area lies in the Lab Bay Project Area. It has been determined that the Lab Bay project is the most logical choice to meet FSH proportionality percentages in K03. For this reason, the Lab Bay Draft EIS was delayed until November 1, 1993, to restructure the alternatives for that project to increase the harvest of volume class 4/5 and to decrease the harvest of volume class 6/7. Consequently, it has been determined that a temporary departure from FSH proportionality percent is acceptable in K03 for the CPOW project.

Table 3-46 displays the proportionality for all action alternatives for all the management areas (MA's) within the CPOW Project Area.

Table 3-46
Proportionality Table

MA	Acres VC 4-5	Acres VC 6-7	FSH Baseline%	New Baseline%	After %	Diff.*
Alt. 1						
K03	0	0	0.1895	0.1840	0.1772	-0.007
K07	0	0	0.3183	0.2899	0.2892	-0.001
K08	0	0	0.2148	0.2438	0.2455	0.002
K09	0	0	0.1906	0.1770	0.1746	0.005
K10	0	0	0.2108	0.2145	0.2156	0.001
Alt. 1a						
K03	0	0	0.1895	0.1840	0.1772	-0.007
K07	-566	-156	0.3183	0.2899	0.2879	-0.002
K08	0	0	0.2148	0.2438	0.2455	0.002
K09	-186	-151	0.1906	0.1770	0.1771	0.000
K10	0	0	0.2108	0.2145	0.2156	0.001
Alt. F2						
K03	226	66	0.1895	0.1840	0.1768	-0.007
K07	2,302	1,067	0.3182	0.2899	0.2868	-0.003
K08	1,460	158	0.2148	0.2438	0.2523	0.008
K09	2,782	321	0.1906	0.1770	0.1813	0.004
K10	745	38	0.2108	0.2145	0.2329	0.018
Alt. F3						
K03	567	141	0.1895	0.1840	0.1767	-0.007
K07	1,919	883	0.3183	0.2899	0.2873	-0.003
K08	2,285	379	0.2148	0.2438	0.2535	0.010
K09	1,886	248	0.1906	0.1770	0.1783	0.001
K10	890	106	0.2108	0.2145	0.2304	0.016
Alt. F4						
K03	376	88	0.1895	0.1840	0.1770	-0.007
K07	2,532	1,142	0.3183	0.2899	0.2871	-0.003
K08	938	158	0.2148	0.2438	0.2486	0.005
K09	2,431	191	0.1906	0.1770	0.1826	0.006
K10	1,002	118	0.2108	0.2145	0.2327	0.018
Alt. F5						
K03	321	0	0.1895	0.1840	0.1788	-0.005
K07	3,144	1,174	0.3183	0.2899	0.2911	0.001
K08	1,067	129	0.2148	0.2438	0.2501	0.006
K09	2,739	299	0.1906	0.1770	0.1816	0.005
K10	723	36	0.2108	0.2145	0.2324	0.018

continued

Table 3-46 continued

MA	Acres VC 4-5	Acres VC 6-7	FSH Baseline%	New Baseline%	After %	Diff.*
Alt. F6						
K03	138	0	0.1895	0.1840	0.1779	-0.006
K07	3,174	767	0.3183	0.2899	0.2989	0.009
K08	1,274	224	0.2148	0.2438	0.2495	0.006
K09	2,461	302	0.1906	0.1770	0.1800	0.003
K10	858	38	0.2108	0.2145	0.2364	0.022

* "-" indicates a lower proportion of volume class 6 and 7 is projected to be remaining after the alternative than was in the management area prior to the project.

All alternatives are projected to result in proportionality consistent with the FSH direction for proportionality in management areas (MA) K08, K09, and K10. In these management areas, the proportion of volume class 6 and 7 is improved over what existed prior to TTRA. In addition, Alternatives F5 and F6 are projected to improve the proportionality of volume class 6 and 7 for MA K07. Alternatives 1, 1a, F2, F3, and F4 are projected to result in a temporary proportionality departure at the time the proposed activity is completed for MA K07. However, the indicated proportionality departure is within the tolerance specified within the Forest Service Handbook. All alternatives show a temporary departure in proportionality in MA K03 that is beyond the tolerance specified in the Forest Service Handbook. This temporary departure will be remedied in the Lab Bay project, which contains the bulk of MA K03.

All alternatives have been determined to be viable in terms of compliance with the proportionality provisions of the TTRA based on the analysis specified in FSH 2409.18, Supplement 92-5. This analysis shows that there is sufficient timber base available for one or more additional entries prior to the end of the rotation. This analysis concludes that opportunities exist for achieving proportionality under the terms of the Long-Term Contract prior to its scheduled expiration in 2004. This analysis also concludes that the potential future offering would be economical based upon mid-market values and costs as of the NEPA start date for this analysis (09-07-91, the date the Notice of Intent was filed). The next entry would propose to harvest a total of approximately 12,500 acres, 2,500 of which would be classified as Volume Class 6 or 7 by the GIS area timber type map. The projected proportionality after this next entry would be .1840 for MA K03 and .2899 for K07.

Size of Harvest Units

The National Forest Management Act of 1976 (NFMA) specifies a limit on the size of forest openings that may be created, based on the forest type. For the western hemlock/Sitka spruce forest type associated with Southeast Alaska, this maximum opening size is 100 acres. The NFMA provides flexibility to exceed this opening size in situations where larger units will produce a more desirable contribution of benefits. Factors as specified in the NFMA and the Alaska Regional Guide provide for the following exceptions:

1. Topography.
2. Spatial relationship of unit to other natural or artificial opening and proximity of units.
3. Coordination and consistency with adjacent management areas.
4. Effect on water quality and quantity.
5. Visual absorption capacity.
6. Effect on wildlife and fish habitat.
7. Regeneration requirements for desirable tree species, based on latest research.
8. Transportation and harvesting system requirements.
9. Natural and biological hazards to the survival of residual trees and surrounding stands.
10. Relative total costs of preparation, logging, and administration of harvest cuts.

The average individual unit size is approximately 41 acres. There are numerous situations where more than one unit was grouped together to form a larger contiguous opening. Where it is determined by the IDT that exceptions to the size limitation are warranted, the actual size limitation of openings may be up to 100 percent greater (200 acres) for factor 9, and up to 50 percent greater (150 acres) for all other factors, with the approval of the Forest Supervisor. Exceptions to the 100-acre size limit in excess of 50–100 percent greater are permitted on an individual timber sale basis after 60 days public notice, and review and approval by the Regional Forester.

The actual determination of unit size and configuration will be determined during field layout and traversing. Each of the action alternatives proposes harvest units or combinations thereof which are currently planned to exceed 100 acres but are less than 150 acres. Table 3-47 shows the units which exceed 100 acres (but are less than 150 acres) due to logging/transportation system requirements (reason #8 above).

Table 3-47
Harvest Units Exceeding 100 Acres Due to Logging or Transportation System Requirements

Harvest units	Opening size	Alternatives proposed
586-232,598-242	117	F2, F4,F5,F6
588-310,588-312	111	F2,F3,F4,F5,F6
598-207,598-207B	144	F3,F4

Table 3-48 shows the units that exceed 100 acres (but are less than 150 acres) due to the relative cost of preparation, logging, and administration (reason #10 above).

Table 3-48
Harvest Units Exceeding 100 Acres Due to Costs of Logging, Preparation, and Administration

Harvest units	Opening size	Alternatives proposed
551-249, 551-250	102	F3
552-201,552-202	104	F3
571-225,571-257,571-258	111	F6
571-225,571-256,571-257,571-258	150	F2,F3,F4,F5
571-227	111	F2,F3
571-209,571-210,571-213,571-214	130	F6
572-211,572-222	120	F2,F3,F4,F5,F6
573-203,573-274,573-275	107	F2,F3, F6
573-242,573-243,573-244	127	F2
574-210,574-224	105	F2,F3
574-247,574-248	116	F2, F4,F5,F6
579-203,579-205	125	F2
579-203,579-205,580-202	143	F5,F6
579-208,579-209	106	F2,F3,F4
579-215,579-216,579-219	119	F3,F4,F5,F6
580-212,580-213	110	F2, F4,F5,F6
580-218,580-219	113	F2, F4,F5
580-227,580-227B,580-230	123	F4,F5
582-214,582-215	117	F2, F5,F6
583-215,583-216	122	F2, F4,F5,F6
583-242,583-243	123	F2, F5,F6
584-250,584-251	104	F2,F3,F4,F5,F6
584-272	132	F2, F4,F5,F6
585-201,585-202,585-203	123	F2,F3,F4,F5
586-226,586-227	121	F3,F4,F5,F6
586-228,586-229	119	F2, F6
586-232,598-242	117	F2, F4,F5,F6
588-212,588-212B,588-213,588-213B	135	F2,F3,F4,F5,F6
588-259,588-260,588-261,588-262,588-263	121	F2,F3,F4,F5
588-269,588-270	130	F2,F3,F4,F5
588-283,588-285	125	F2, F4
588-301,588-302	106	F2
588-304,588-305,588-306	116	F2, F6
588-310,588-312	111	F2,F3,F4,F5,F6
588-322	140	F2,F3,F4,F5,F6
588-327	111	F4,F5
589-203,589-204,589-205	128	F5,F6
590-210,590-211	106	F2, F4,F5
590-229,590-230	107	F2, F4, F6
598-207,598-207B	144	F3,F4

There are also units or groups thereof which either exceed 150 acres in combination or else combine with an adjacent previously created opening to form a contiguous opening greater than 100 acres. Past harvest units are considered openings until the average tree height of the regenerated stand is at least five feet. Because these units exceed the maximum unit size specified by NFMA, it will be necessary to mitigate the opening created by these units. Mitigation measures include utilization of 300–500-foot leave strips or uneven-aged silvicultural prescriptions. These leave strips can play an important role in ecosystem management, by providing wildlife corridors,snag recruitment, legacy trees, refugia for vascular plants, smaller openings (less than 100 acres), and visual diversity. Table 3-49 shows the units to which these mitigation measures may be applied.

Table 3-49
Harvest Units Exceeding 150 Acres Adjacent to Recently Harvested Units, by Alternative

Harvest units	Opening size	Alternatives proposed
571-226,571-227	159	F6
571-226,571-227,571-260	210	F5
571-253	115 (Adjacency)	F2,F3,F4,F5
572-211,572-212,571-221,571-222	206	F6
574-239	128 (Adjacency)	F6
571-209,571-210,571-213,571-214	130	F6
579-215,579-216,579-217,579-218,579-219	193	F5,F6
584-218	120 (Adjacency)	F2,F3,F4,F5,F6
585-201,585-202,585-203,585-204	152	F3
586-216,586-217,586-218,586-218B	128 (Adjacency)	F2,F3,F4,F5,F6
586-225,586-226,586-227,586-228,586-229	292	F6
588-268,588-269,588-270	172	F6
588-283,588-285,588-286,588-287	199	F5,F6
588-300,588-301,588-302	154	F6
588-322,588-324,587.1-206,587.1-208	323	F6
589-230,589-231,589-232,589-233	173	F5,F6
598-220,598-222	267 (Adjacency)	F2,F3,F4, F6
598-220,598-222,598-222B	280 (Adjacency)	F5

Implementation of these leave strips may increase blowdown potential and require additional time for on-ground harvest unit layout. Harvest volume will decrease for the alternatives under consideration, as well as for future timber supply (leave strips may be too small to justify a subsequent entry from an economic standpoint.)

Timber Economics

Timber harvest can provide significant direct and indirect economic value to local communities, and can have a significant direct and indirect economic impact on the regional and national levels. On the local level, direct values include employment for loggers, road builders, and mill workers. The Forest Service returns 25 percent of net receipts plus purchaser credits to the state to be used for local schools and road maintenance. Within timber-based communities, fluctuations in harvest levels can substantially affect both jobs and funding for education and roads.

Current Forest Service Handbook direction (FSH 2409.18, R-10 Supp.6, 1989) for Region 10 requires the completion of a mid-market analysis to compare benefits and costs of a project. This handbook also directs that timber harvest projects provide at least 60 percent of normal profit and risk, which must be included when calculating costs. This mid-market analysis is performed by comparing expected gross revenues to estimated costs and arriving at an estimate of net revenues. In order to account for market fluctuations, weighted average timber values over the past 13 years are used in the analysis. The mid-market base period is determined by the Notice of Intent date (August 30, 1991 for CPOW).

Pond values represent the delivered price of logs at the mill minus the cost to manufacture them into useable products. This value is determined by estimating the percentage of the logs that are sawn *vs* pulped, and then applying the appropriate product value. This sawn *vs* pulp percentage is adjusted quarterly, based upon market conditions. Pond values are closely related to volume class data which incorporate log size, grade, and species. On the Ketchikan Area, the lower volume classes generally have a higher yellowcedar component which has the highest selling value. Consequently, pond values are frequently higher for the lower volume classes.

Stump-to-truck logging costs are subtracted from the pond values to arrive at a delivered price to the mill. Stump-to-truck logging costs include felling, bucking, yarding, loading, 60 percent of normal profit and risk, and administrative costs. Logging costs are closely tied to volume per acre (represented by volume class data). Generally the higher the volume per acre the lower the logging cost.

There were several changes made in the way logging costs were calculated between the Draft and the Final EIS. First, a cost component for logging overhead was omitted from calculations in the Draft but was included in the Final EIS. Second, revised logging systems, unit configurations, and road locations were incorporated based upon field recon information. Last, in response to public comment, the Forest Service revised the method for calculating helicopter costs. In the Draft, helicopter costs were taken directly from the Timber Appraisal Handbook and adjusted for the appropriate mid-market base period. For the Final EIS, helicopter costs were estimated using the HELI-PACE computer program which produces site-specific helicopter costs based upon volume per acre, average piece size, average yarding distance, silvicultural system (residual canopy closure), average elevation of harvest unit, and landing elevation. Rather than using HELI-PACE to produce a helicopter cost for each volume class, helicopter costs were broken into clearcut harvest *vs* partial cut harvest. Table 3-50 compares the helicopter costs used in the Draft EIS to the ones used in this Final EIS.

Table 3-50
Helicopter Costs

DEIS				FEIS	
VC 4	VC 5	VC 6	VC 7	Clearcut	Partial cut
199.52	191.77	168.71	156.04	231.45	272.32

Table 3-51 shows the stump-to-truck logging costs and associated pond values for each volume class, based upon first quarter 1990 data.

Table 3-51
Summary of Stump-to-Truck Logging Costs and Pond Values, by Volume Class, in MBF

Volume	High Lead		Skyline		Slack		60%	Pond
Class	Up	Down	Running	Live	Line	Helicopter	Profit/Risk	Value
4	184.68	213.75	161.80	177.25	219.25		47.58	369.25
5	154.13	176.19	140.33	149.48	182.76		47.72	332.36
6	114.95	131.50	108.84	112.43	138.39		50.16	315.47
7	88.22	100.29	86.77	87.20	106.56		50.16	310.71
CC						231.45		
PC						272.32		

CC = clearcut PC = partial cut

In addition to logging costs, costs related to truck haul, dump, tow, raft, specified road construction and reconstruction, temporary road construction, Log Transfer Facility (LTF) construction, camp development, and camp mobilization costs need to be considered when determining the economics of timber sales. For the purposes of this analysis, haul, dump, tow, and raft costs were estimated at $35 per MBF. Because the timber associated with the CPOW project can be logged by existing logging camps, there will be no camp development or mobilization costs. Similarly, all timber can be hauled to existing LTF's, so this cost can be eliminated. It is estimated that specified road construction will average between $144,500 to $198,100 per mile, while temporary road construction will be approximately $100,000 per mile. Specified road reconstruction is estimated to range from $12,300 per mile for normal reconstruction to $48,100 per mile for heavy reconstruction. These cost do not include extra move-in/move-out expense for fish-timing associated with bridge and culvert placement. It is estimated this cost alone could exceed one million dollars, which is roughly an additional $4/MBF (J.Oien, Tongass National Forest, pers. comm.). These costs may be reduced substantially, as the Long-Term Contract moves from a unit-by-unit release schedule to an overall offering area schedule. For this reason, fish-timing costs are not included.

Estimated net timber value (stumpage) is arrived at by subtracting all associated logging and road costs from the pond value for all proposed harvest units in each action alternative. Individual units that may be uneconomical to harvest by themselves would be offset by blending them with other units that are economical to harvest. This would result in less productive lands or lands where the timber is highly defective being made economically viable for timber harvest.

Table 3-52 shows the estimated mid-market stumpage for each alternative.

Table 3-52
Summary of Mid-market Stumpage Values, by Alternative

Alt.	Estimated Volume (MBF)	Pond Value ($/MBF)	60% Profit/ Risk ($/MBF)	Logging Cost ($/MBF)	Temporary Road Cost ($/MBF)	Specified Road Cost ($/MBF)	Net Stumpage ($/MBF)
1	0	0	0	0	0	0	0
1a	0	0	0	0	0	0	0
F2	264,093	336.82	48.24	212.94	1.65	70.70	3.29
F3	259,527	338.52	48.28	194.88	4.58	88.37	2.41
F4	257,799	336.39	48.26	213.87	3.09	70.14	1.03
F5	263,836	337.72	48.16	218.90	2.13	64.70	3.83
F6	259,314	339.31	48.16	221.82	2.13	66.62	0.58

Based on this analysis, all action alternatives show a positive net stumpage (with the assumption that fish timing costs are excluded). Alternative F3 has the lowest logging cost because it proposes no helicopter yarding. However, Alternative F3 also has the highest roading cost because it requires more road construction. The results of this analysis indicate that net harvest receipts are roughly equivalent for helicopter/no road *vs* cable yard/road construction. It is noted that Alternative F3, which was designed to produce the most economical timber harvest, has the most negative return after payments to the State of Alaska. This is because Alternative F3 is a non-helicopter alternative and proposes to build the most roads, and because 25 percent of purchaser road credits for specified roads are returned to the State of Alaska.

In response to public comment on the CPOW Draft EIS, an updated timber appraisal was developed, using logging costs (including helicopter costs derived by HELI-PACE) and selling values in effect April 13, 1993. The intent of this updated analysis was to provide an estimate of an actual appraisal of the project as a whole, based upon the most current costs available. This updated appraisal differed from the mid-market analysis in that full profit and risk was allowed (instead of only 60 percent). All other assumptions were the same as in the mid-market analysis, except current costs and selling values were used. Based on this analysis, all alternatives appraised in a deficit situation, i.e., with an indicated stumpage below base rates. Table 3-53 shows the estimated appraised stumpage resulting from current cost.

Table 3-53
Summary of Current Stumpage Values, by Alternative

Alt.	Estimated Volume (MBF)	Pond Value ($/MBF)	100% Profit/Risk ($/MBF)	Logging Cost ($/MBF)	Road Cost ($/MBF)	Net Stumpage ($/MBF)
1	0	0	0	0	0	0
1a	0	0	0	0	0	0
F2	264,093	385.95	83.62	240.36	70.70	-10.38
F3	259,527	387.58	83.57	219.50	88.37	- 8.44
F4	257,799	385.68	83.68	241.90	70.14	-13.13
F5	263,836	385.36	83.53	239.86	64.70	- 4.86
F6	259,314	385.73	83.56	239.88	66.62	- 6.46

This analysis reflects current market conditions. It should be noted that the sawtimber market is in an upswing, which may be expected to continue for some period of time. The chip market, while not as strong as sawtimber, is fairly stable. This indicates that it is likely that CPOW Offering Areas will appraise above base rates at time of sale.

It cannot be over-emphasized that these projected pond values and logging/road costs are based on the information available at this time. Before the timber is offered to KPC in individual sales, the timber will be cruised and appraised, using current selling values and costs to determine the volume and value of the timber.

Returns to U.S. Treasury

The Timber Sale Program Information Reporting System (TSPIRS) shows the Tongass National Forest as a whole has made a profit, before payments to the State of Alaska, in three of the past four years. Table 3-54 summarizes this information.

Table 3-54
TSPIRS Report 1 for Tongass NF as a Whole

	FY 1989	FY 1990	FY 1991	FY 1992
Harvest (MMBF)	444.6	470.7	363.7	369.7
Revenues*	$22,539	$29,812	$29,632	$11,489
Expenses*	$13,852	$16,239	$16,527	$21,629
Net Revenue*	$ 8,687	$13,573	$13,105	-10,140

* in thousands of dollars

A TSPIRS-type assessment for the CPOW Final EIS was considered but not implemented. TSPIRS was designed to be analyzed on an annual basis at the National Forest level for the entire timber program, with the expenses and costs amortized over the length of the rotation (100 years). This is particularly hard to do on a project-by-project basis, especially for roads. In addition, TSPIRS counts all of the expenses associated with a timber sale, including the NEPA prep work, inventories, etc. These expenses are put into a sale or growth activity pool, and a percentage is charged off each year based on how much volume is harvested and how much is remaining under contract. Allocating this annual expense is very difficult to do on a project-by-project basis.

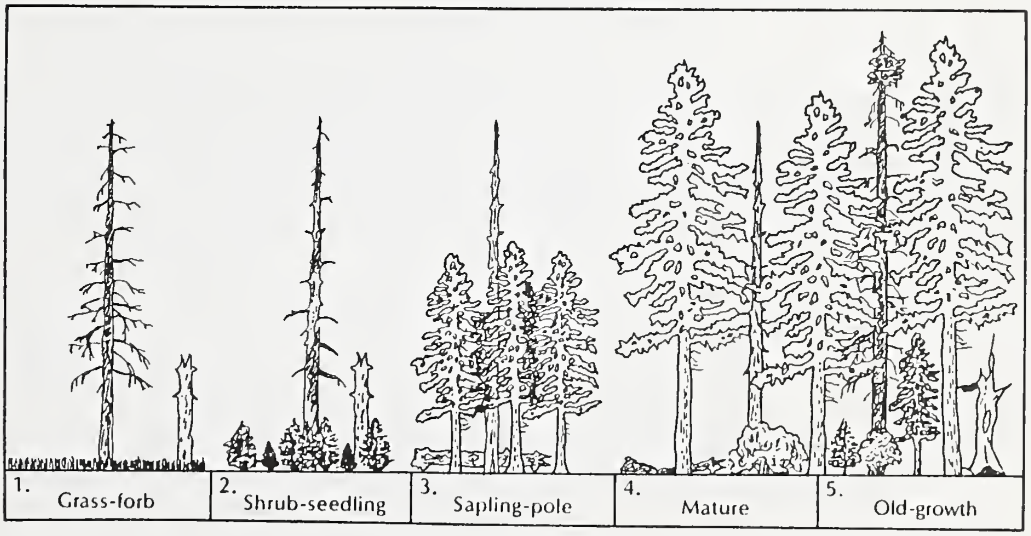
Cumulative Effects

Plant Succession

After reforestation, managed forests grow through several distinctive successional stages which generally are applicable to all units proposed for harvest under the action alternatives. Characteristics such as height, diameter, and productivity vary according to site class (discussed previously in this section). Different components dominate the stand at different stages, and the overall forest structure changes over time.

The first 20 years following harvest is referred to as the seedling-sapling understory colonization stage. During the first 5 years of this stage, the young stand receives maximum sunlight, resulting in the rapid establishment of a variety of shrubs, forbs, and grasses. There is little incidence of damage or mortality from disease or infestation at this stage. The changed structure of the young stand affects the structure of adjacent stands. Windthrow potential of the adjacent stand increases with greater wind exposure, and understory development accelerates due to increased sunlight into the newly developing stand.

In years 5 to 20, seedlings grow into a vigorous new forest of trees, averaging about 25 feet in height and 4 inches diameter at breast height (DBH). Understory production of woody-stemmed species is at its highest at this stage, especially in blueberry-dominated sites. Larger dead materials from the original stand begin to decompose, and the stand edge stabilizes, resulting in less windthrow to the adjacent stand. At the end of this successional stage, the stand can be considered for precommercial thinnning, leaving a species composition of about 60 percent western hemlock, 40 percent Sitka spruce, and a small cedar component.



The next successional stage occurs during years 20 to 50 following harvest and is referred to as the understory exclusion stage. It is characterized by accelerated tree growth (approximately one foot per year) and a rapidly closing tree crown canopy. At age 50, tree heights average about 76 feet and diameters average about 8 inches, depending on the site class. Tree crowns begin to grow closer together, causing the understory to change from a dense shrub, herb, and seedling-dominated structure to one of dense moss. Stands which have been precommercially thinned will have a two-layered canopy with western hemlock in the lower story. Canopy closure will occur more slowly in precommercially thinned sites. As any proposed harvest would probably not begin until 1993 and is expected to be substantially complete in 1996, none of the units proposed for harvest at this time would grow into this successional stage by 2004. The only change that occurs is the growth of some of the existing harvest units into the understory exclusion stage.

In years 50 to 80, the stand remains closed. At age 80, tree heights average about 105 feet and diameters average about 12 inches, depending on site class. Little sunlight reaches the forest floor, and the understory continues to be dominated by moss. Tree diameter growth slows to about one inch every ten years, as competition between trees increases. It is not currently economically feasible to commercially thin trees at this stage, but thinning would increase growth and diversity of the shrub layer, as well as increase diameter growth of the remaining trees.

In years 80 to 100—the mature, even-aged forest and understory reinitiation stage—the stand becomes mature. At age 100, tree heights average about 120 feet and diameters average about 14 inches, depending on site class. Some trees may die, while others become clearly dominant in size. Diameter growth remains at less than 1 inch every 10 years. Moss continues to dominate the understory, except in places where the canopy has opened and allowed sufficient light for herbaceous plants. These structural characteristics continue into the later stages of the stand (approximately 100 to 160 years) with continued slow growth and occasional openings in the canopy (USDA Forest Service 1989).

The final successional stage for a forest is the old-growth stage, which would pertain to stands that are prescribed to be managed for old-growth conditions or stands that have been deferred for harvest. This stage is characterized by a multi-storied stand with a large over-mature overstory composed of live and dead trees and an understory of mostly shade-tolerant western hemlock. There would be a substantial component of downed large trees and occasional openings in the forest canopy. Patches of shrubs, tree saplings, and herbs alternate with patches of overmature timber, creating a complex, multilayered mosaic. The stand declines in growth and has the highest degree of variation and most structurally diverse understory of any successional stage.

Regeneration

All of the areas proposed for harvest will be restocked within five years of harvest, either by natural regeneration or by replanting. The Forest Service is required by law, regulation, and policy to plan timber harvest only where there is assurance that such land can be regenerated within five years after the harvest is completed. Current management prescriptions for the CPOW Project Area specify natural regeneration to restock most clearcut harvested stands. Artificial regeneration by hand planting would serve as the backup method for units that could not be certified as adequately stocked within five years after harvest, or for units where the silvicultural prescription calls for the planting of particular species to meet specific resource objectives.

While units that will require supplemental hand planting can't be positively identified until harvest and natural regeneration have been allowed to run their course, based on preliminary office and field recon the following units have been identified as having potential natural regeneration concerns. Regeneration in these units will be monitored closely:

552-215	554.2-201	573-249	573-251	580-212
580-212	581-241	584-226	584-227	585-210B
584-252	585-210 B	588-300	588-301	589-214
588-305	589-214			

Yellowcedar and western redcedar are less adaptable to natural regeneration following clearcut harvest. In order to maintain the cedar component of stands where they naturally occur, the Forest Service could hand plant or use an alternate silvicultural system such as shelterwood trees. CPOW has several units with a high cedar component which are planned for helicopter yarding. In this case, hand planting would be prohibitively expensive, so these units are being designed to leave all the cedar uncut, which will favor natural cedar regeneration. It is estimated that approximately 70 percent of the volume will be harvested, with the remainder being left to provide a seed source and protection for the newly regenerated stand. These units are characterized by having a high cedar component, being planned for helicopter yarding, and being either above 1,200 feet elevation on a north or east aspect or over 1,500 feet elevation on a south or west aspect. These units include:

573-249	573-251	574-239	580-200	588-283
584-272	588-283	590-210	590-211	
590-219				

There were a few units identified during field recon which would benefit from a seed tree harvest. This silvicultural system resembles a shelterwood, but is utilized where the objective is only establishment and not subsequent protection of the new stand. It is estimated that this silvicultural system will harvest approximately 90 percent of the stand with the residual trees providing seed source. The following units are prescribed for seed tree harvest:

549.2-205
572-221
585-215

Site preparation for natural regeneration by broadcast burning has not been found to produce acceptable results and probably will not be used for units proposed for harvest by this project.

Precommercial Thinning

Stocking on many sites can average 4,000 stems per acre, which is far in excess of fully stocked stand conditions. Although these stands may eventually thin naturally, production of commercially useable wood would be hastened if stocking were less dense through the use of precommercial thinning (Harris and Farr 1974). The current Forest Plan estimates that for every acre precommercially thinned, timber growth and yield increase by approximately 5.4 MBF. Because thinning allows the understory vegetation and the remaining trees to grow at accelerated rates, forage production and ultimate sawlog volume would be increased. Thinning also encourages faster successional change and more rapid conversion to climax vegetation conditions. Because precommercial thinning is typically performed when the stand reaches approximately 20 years of age and is dependent on site, stocking, and other resource needs, it is not feasible to project which proposed harvest units will benefit from precommercial thinning in the future. Future funding levels may also determine priorities for thinning.

Projected Future Harvest Through 2004

The harvest schedule in Appendix A calls for a second entry into the CPOW Project Area to occur in the year 1999 at a harvest level of approximately 356 MMBF. The CPOW Draft EIS erroneously used an earlier version of Appendix A which called for harvest of 270 MMBF. The CPOW MELP completed in 1991-92 identifies individual harvest units within the Project Area which can be considered for harvest during the next timber entry. In order to estimate the VCU's where this future harvest will occur, the percentage of harvest units by VCU in the MELP was applied to the 356 MMBF target associated with this second entry. By prorating this percentage occurrence to the 356 MMBF target, it was possible to roughly estimate the second entry by VCU. By adding this second entry to the harvest for this project (estimated by the Preferred Alternative) plus previous harvests, this represents the total projected harvest within the CPOW Project Area through the life of the Long-Term Contract.

For this analysis to project the percentage of the sawtimber available for harvest within the Project Area that will have been harvested by the expiration of the LTS contract, it is necessary to make two assumptions:

1. Previous timber harvest has occurred in areas where the standards and guidelines of the Forest Plan revision no longer permit timber harvest, e.g., streamcourse buffers, 500-foot saltwater buffers, etc. For the purposes of this analysis, it is necessary to assume that past harvests approximate land that can be reharvested.

2. The TLMP Draft Revision, Alternative P, schedules all (approximately 114,016 of the 114,260 acres) of the suitable available land within the Project Area. This has been determined to be the best estimate of future timber supply.

By comparing projected cumulative harvest through the end of the KPC contract with the sum of past harvest plus the remaining suitable available lands scheduled by Alt. P of the TLMP Draft Revision, it is possible to estimate the percentage of available sawtimber that will have been harvested by the end of the KPC contract. Table 3-55 shows projected harvest through the end of the long-term contract in 2004, and also shows the projected percentage of available sawtimber harvested.

Table 3-55
Cumulative Effects of Next Timber Entry into CPOW Area, by VCU

VCU	Past Harvest	CPOW Project*	Next Entry	Cumul. Harvest	Percent CFL	% Available Sawtimber Harvested by 2004 **
538	528	0	0	528	NA	NA
549	1,137	117	317	1,571	43	49
550	3,983	238	388	4,609	64	65
551	80	0	219	299	16	NA
552	657	0	905	1,562	25	36
553	0	0	481	481	15	19
554	2,993	204	281	3,478	59	58
557	2,240	46	179	2,465	83	68
571	5,061	733	561	6,355	59	60
572	1,591	159	284	2,034	53	51
573	3,505	334	1,609	5,448	31	36
574	3,456	156	656	4,268	40	27
577	4,173	474	526	5,173	51	36
579	3,741	785	172	4,698	71	69
580	2,335	493	488	3,316	35	38
581	6,164	290	651	7,105	54	59
582	7	195	202	404	17	22
583	3,508	448	568	4,524	54	60
584	3,523	512	843	4,878	51	52
585	4,605	289	292	5,186	70	72
586	3,742	470	79	4,291	76	60
587	2,634	292	178	3,104	45	57
588	9,983	1,765	988	12,736	63	72
589	2,918	696	728	4,342	34	38
590	3,408	773	259	4,440	47	51
598	2,401	367	488	3,256	39	53
599	78	0	136	214	NA	NA
600	0	0	0	0	NA	NA
601	75	0	0	75	NA	NA
TOTAL	78,526	9,836	12,478	100,840	49	51

* Estimated by Alt. F5.

** Estimated by previously harvested areas plus suitable-available lands scheduled by Alt. P of the TLMP Draft Revision.

By the year 2004 (when the Long-Term Contract with KPC expires), approximately 51 percent of the currently identified available sawtimber within the CPOW Project Area will have been harvested according to Alt. P of the TLMP Draft Revision. This indicates the Project Area can sustain roughly the same harvest level over the second half of the rotation as it did over the first half.

Future Timber supply

There are four active EIS projects analyzing timber harvest on Prince of Wales Island for the long-term contract. These four projects (Lab Bay, CPOW, Control Lake, and Polk Inlet) cover all the National Forest System land from Point Baker to Cholmondeley Sound, a total area of just under one million acres. Due to data limitations, the Polk Inlet timber supply is not included in this analysis.

The TLMP Draft Revision made an estimation of available timber, based upon land use allocations.

Tables 3-56 through 3-58 show by VCU and Project Area the estimated acres which have already been harvested through the end of the long-term contract. This approximates the amount of timber harvested during the first half of the forest rotation. The future timber supply, i.e., the timber that is available for the second half of the rotation, is estimated by the TLMP Draft Revision data.

Table 3-56
Estimated Acres Harvested Through 2004: Lab Bay

VCU	Harvested Acres for 1st Half of Forest Rotation	Available Acres for 2nd Half of Forest Rotation*
527	2,244	2,335
528	1,254	1,639
529	4,408	5,977
530	2,483	3,586
531.1	2,794	5,692
532	5,002	2,756
533	2,277	5,109
534.1	734	467
534.2	1,052	0
535	1,479	1,476
536	2,188	1,876
537.1	2,041	2,351
538	5,817	2,043
539	1,762	2,893
540	955	1,731
551	1,133	1,889
TOTAL	37,623	41,820

* Estimated by TLMP Draft Revision, Alt. P.

Table 3-57

Estimated Acres Harvested Through 2004: CPOW

VCU	Harvested Acres for 1st Half of Forest Rotation	Available Acres for 2nd Half of Forest Rotation*
549.2	1,571	1,650
550	4,610	2,521
551	299	1,045
552	1,562	2,815
553	481	2,020
554.2	3,478	2,570
557	2,465	1,152
571	6,355	4,294
572	2,034	1,938
573	5,448	9,538
574	4,268	6,240
577	5,173	4,248
579	4,698	2,067
580	3,316	5,306
581	7,105	4,901
582	404	1,445
583	4,524	3,072
584	4,878	4,463
585	5,186	2,005
586	4,291	2,809
587.1	3,104	2,364
588	12,736	4,931
589	4,342	6,955
590	4,440	4,337
593	9	3,081
598	3,247	2,872
599	214	1,063
TOTAL	100,238	91,702

* Estimated by TLMP Draft Revision Alt. P

Table 3-58

Estimated Acres Harvested Through 2004: Control Lake

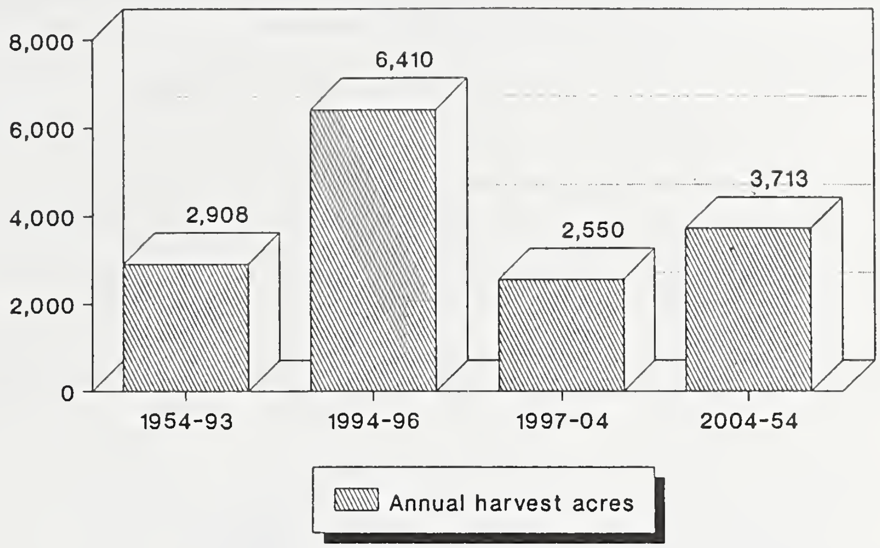
VCU	Harvested Acres for 1st Half of Forest Rotation	Available Acres for 2nd Half of Forest Rotation*
571	75	NA
574	262	5,330
575	1,528	8,689
576	1,062	5,185
577	2,228	4,130
578	1,659	2,991
589	10	NA
591	362	1,684
592	479	766
593	589	NA
594	197	6,540
595	1,409	6,470
596	764	3,915
597.1	456	984
597.2	4,438	6,000
TOTAL	15,518	52,684

* Estimated by TLMP Draft Revision Alt. P

The TLMP Draft Revision identified approximately 223,283 acres of suitable available lands within these three project areas. The current round of EIS's is expected to harvest approximately 19,230 acres of this sawtimber, and the next entry (according to Appendix A) is scheduled to harvest 17,847 acres. By the termination of the Long-Term Contract in 2004, approximately 153,379 acres will have been harvested from these project areas. The TLMP Draft Revision indicates 186,206 acres of sawtimber will be available for the second half of the rotation. Figure 3-17 shows the average annual harvested acres within the three project acres for the past entry (1954–1993), the current entry (1994–1996), the next entry (1997–2004), and for the second half of the rotation (2005–2054).

Log scaling.

Figure 3-17
Average Annual Harvest Acres Within Lab Bay, CPOW, and Control Lake



To estimate the effect on available sawtimber volume, the TLMP Draft Revision indicates 4.5 billion board feet is available, which equates to approximately 90 MMBF annually on an even-flow basis. Factórs which may modify this even flow of harvest include: reduced use of clearcutting; unharvestable acres due to protection of resource concerns (unstable soils, additional stream buffers, cultural resources, wildlife habitat, cave resources, logging and road feasibility, visual management objectives, etc.); timber economics; and new environmental regulations over the next 50 years. The distribution of the Ketchikan Area's timber harvest over the next 50 years is shown in Table 3-59, which is based upon the timber sale schedule of TLMP Revision Alt. P.

Yearly offer targets may vary depending on the prevailing Forest Plan ASQ level, as well as on congressional direction and funding. Once second-growth stands become available for harvest, timber production may increase in the Project Area.

Table 3-59
Distribution of Ketchikan Area's Timber Harvest Over the Next 50 Years, in MMBF/Decade and MMCF/Decade

Management Area	Year 1995-2004	2005-2014	2015-2024	2025-2034	2035-2044
K01	85/ 20	151/ 33	82/ 20	141/ 33	154/ 36
K03	142/ 33	97/ 22	144/ 37	168/ 40	33/ 8
K04	0/ 0	47/ 10	63/ 15	35/ 8	28/ 7
K05	0/ 0	246/ 56	125/ 29	27/ 6	53/ 12
K07	190/ 44	212/ 46	305/ 74	258/ 61	112/ 29
K08	331/ 77	127/ 28	97/ 24	233/ 54	237/ 60
K09	145/ 34	78/ 17	179/ 44	213/ 50	105/ 28
K10	30/ 7	56/ 13	90/ 23	61/ 15	33/ 8
K11	75/ 17	236/ 54	91/ 23	49/ 11	28/ 7
K14	0/ 0	124/ 28	98/ 23	283/ 67	231/ 63
K15	67/ 16	78/ 17	28/ 7	146/ 34	54/ 13
Subtot*	1,065/248	1,452/324	1,302/319	1,614/379	1,068/271
K17	20/ 5	45/ 11	36/ 9	131/ 31	129/ 32
K18	155/ 36	212/ 46	142/ 32	50/ 11	168/ 46
K19	25/ 6	13/ 3	0/ 0	3/ 1	46/ 13
K20	0/ 0	39/ 9	5/ 1	83/ 19	30/ 7
K21	0/ 0	18/ 4	33/ 8	229/ 52	199/ 52
K22	0/ 0	10/ 2	12/ 3	37/ 9	59/ 15
K24	166/ 38	126/ 29	26/ 6	45/ 9	2/ -
K25	119/ 27	185/46	26/ 6	40/ 9	29/ 8
K28	80/ 19	49/ 13	5/ 1	5/ 1	0/ 0
Subtot**	565/131	697/163	285/ 66	623/142	662/173
K29	175/ 43	6/ 2	169/ 40	23/ 5	16/ 4
K30	135/ 33	15/ 3	180/ 43	49/ 11	31/ 7
K32	330/ 78	83/ 19	85/ 23	66/ 16	287/ 68
K34	0/ 0	4/ 1	9/ 2	0/ 0	0/ 0
K35	75/ 18	102/ 24	275/ 66	28/ 7	116/ 27
K39	82/ 19	137/ 32	42/ 10	20/ 4	45/ 11
Subtot***	797/191	347/ 81	760/184	186/ 43	495/117
K44	0/ 0	1/ -	9/ 2	15/ 4	20/ 5
Subtot****	0/ 0	1/ -	9/ 2	15/ 4	20/ 5
TOTAL KTN AREA@	2,427/569	2,495/569	2,354/569	2,437/569	2,246/569

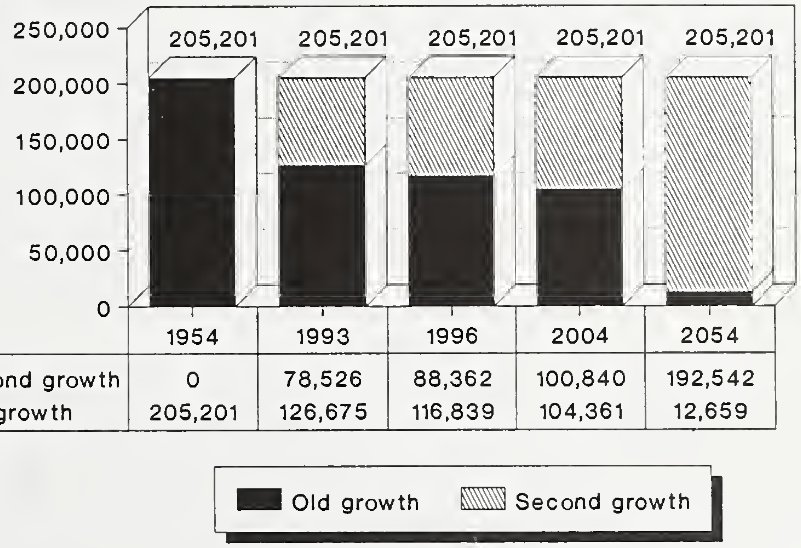
* Subtotal for Thorne Bay Ranger District
** Subtotal for Craig Ranger District
*** Subtotal for Ketchikan Ranger District
****Subtotal for Misty Fiords District
@ Grand total may not sum to total due to rounding.
SOURCE: TLMP Draft Revision, Alt. P.

Cumulative harvest

According to the Forest Plan revision, all suitable-available lands within the Project Area will be harvested by the end of the first forest rotation. Appendix A shows the proposed harvests which will occur within the Project Area through the end of the KPC contract. Subsequent Forest Plans will schedule other areas for decadal timber harvests.

Figure 3-18 shows the relative components of second growth and mature sawtimber with respect to the potentially harvestable lands within the CPOW Project Area. Five time frames are examined: 1954 (start of KPC contract), 1993 (before CPOW), 1996 (after CPOW), 2004 (end of KPC contract), and 2054 (end of first forest rotation).

Figure 3-18
Proportion of Second Growth and Mature Sawtimber in Lands Available for Harvest



	1954	1993	1996	2004	2054
Second growth	0	78,526	88,362	100,840	192,542
Old growth	205,201	126,675	116,839	104,361	12,659

Long-term productivity

The effects of all action alternatives on long-term timber productivity is the conversion of unmanaged, overmature stands to managed, faster growing second-growth stands. All harvested stands are representative of uneven-aged western hemlock stands that commonly take hundreds of years to develop under natural conditions.

There is expected to be an increase in the proportion of Sitka spruce in the second-growth stands. Current uneven-aged stands average 25 percent spruce by volume, while even-aged stands 75–100 years of age average about 50 percent. With the use of precommercial thinning, the spruce component may increase up to 60 percent.

Log grade in second-growth stands is expected to be lower than in old-growth stands, even on sites that have been precommercially thinned. Most second-growth stands will have less variation in tree diameter and height than existing old-growth stands. In addition, second-growth stands will have considerably less volume in the higher grades of logs. Nevertheless, total wood fiber yield will be significantly greater in

second-growth stands. These stands are expected to have increased timber yield over the existing old-growth stands because of improved stocking, less defect, and increased percentage of higher volume species. It has been estimated that these second-growth stands will yield 54 MBF per acre on the average. Assuming all the areas that have been previously harvested (78,526 acres) can be harvested again and that all the areas remaining to be harvested through the end of the first rotation according to the TLMP Draft Revision can also be re-harvested, the average annual yield for the second rotation would be approximately 104 MMBF. The yield may be less if the harvest intensity were reduced for such reasons as decreased use of clearcutting, unfavorable timber economics, inability to harvest areas due to resource concerns, or increasingly more stringent environmental regulations into the 21st century.

WILDLIFE

Key Terms

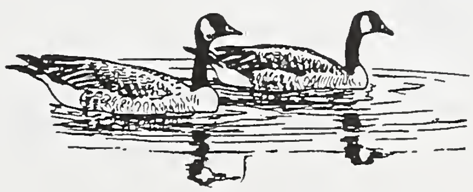
Carrying capacity - the maximum number of a wildlife species that a certain area will support through the most critical period of the year
Habitat - a place that provides seasonal or year-round food, water, shelter, cover, and other environmental conditions for organisms, populations, or communities of plants and animals
Habitat capability - an estimated number of animals that a habitat can sustain
Management Indicator Species (MIS) - species of vertebrates and invertebrates whose population changes are believed to best indicate the effects of land management activities
Viable population - the number of individuals of a species required to ensure the continued long-term existence of the population in natural, self-sustaining populations, adequately distributed throughout their region
Wildlife Analysis Area (WAA) - division of land identified by the Alaska Dept. of Fish and Game and used by the Forest Service for wildlife analysis

Introduction

More than 300 species of mammals, birds, amphibians, and reptiles occur on the Tongass National Forest, and most of these can be found in the Central Prince of Wales (CPOW) Project Area. They occupy a diverse range of land types, plant communities, and special habitats (including the unique cave resources in the Project Area, discussed in the Cave Resources section of this chapter), and are variably adapted to climatic extremes, change in habitat, predation, and hunting pressure.

Alaska's wildlife are valuable for aesthetic, economic, recreational, ecological, and subsistence reasons. Game populations and other products of wildlife habitat supplement the diet of many residents of Southeast Alaska. The Project Area receives some of the highest hunting, fishing, trapping, and recreational use in Southeast. Non-consumptive wildlife uses in the Project Area include such activities as photographing and viewing wildlife.

The Project Area lies within Alaska Department of Fish and Game's "Game Management Unit" (GMU) 2, which includes Prince of Wales Island and all the outer islands which form the Prince of Wales Archipelago.



Affected Environment

Management Indicator Species (MIS)

Management Indicator Species (MIS) are species of vertebrates and invertebrates whose population changes are believed to best indicate the effects of land management activities (USDA Forest Service 1982). Through the MIS concept, the total number of species occurring within a Project Area is reduced to a manageable subset of species that collectively represent the complex of habitats, species, and associated management concerns. The MIS are used to assess the maintenance of population viability (the ability of a population to sustain itself naturally) and biological diversity, and to assess eff-cts on species in public demand (TLMP Draft Revision 1991a).

The following have been selected as Management Indicator Species for this project and will be discussed in detail in this chapter:

SPECIES	RATIONALE FOR SELECTION
Sitka black-tailed deer	Important game species
Marten	Diversity (old growth); important furbearer
Black bear	Represents estuarine habitat; game species
Bald eagle	Old-growth coastline; high public interest
River otter	Represents riparian habitat; furbearer
Hairy woodpecker	Cavity excavator
Brown creeper	Represents large, high volume, old-growth trees
Vancouver Canada goose	Represents riparian habitat; game species
Gray wolf	In response to public comment on CPOW Draft EIS

The following species were selected as Tongass National Forest Management Indicator Species, but have not been selected as MIS for the CPOW project:

SPECIES	RATIONALE FOR NONSELECTION
Red-breasted sapsucker	Adaptable and abundant in Project Area
Red squirrel	Does not occur in Project Area
Brown bear	Does not occur in Project Area
Mountain goat	Does not occur in Project Area

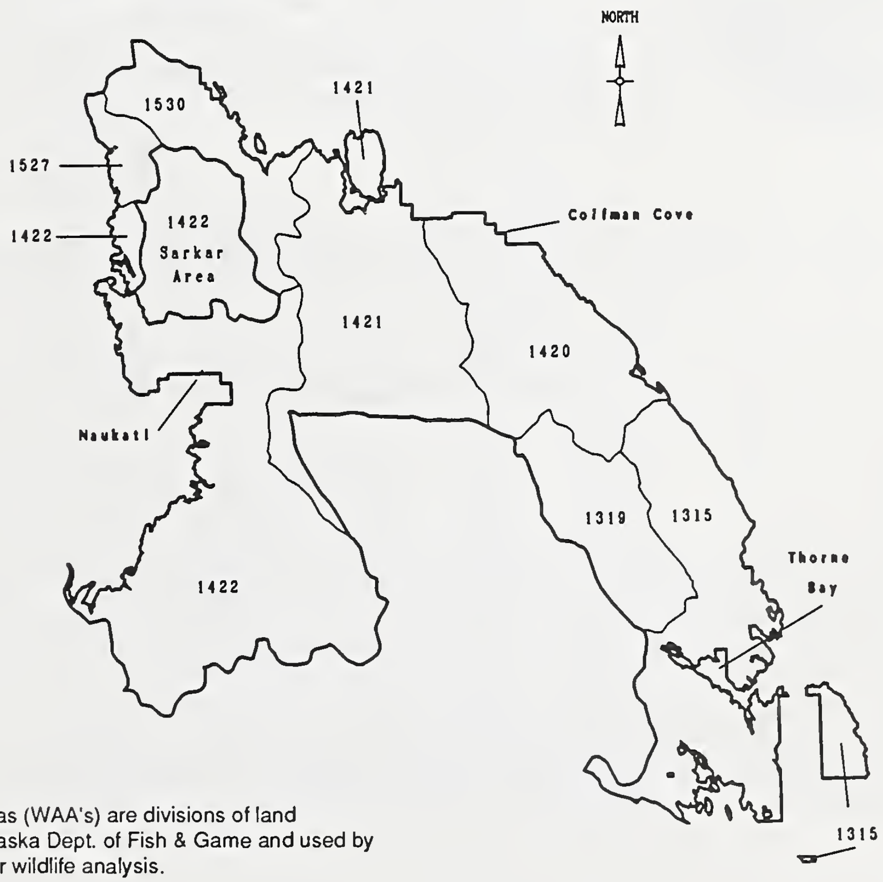
Wildlife Analysis Areas (WAA's)

Wildlife Analysis Areas (WAA's) represent divisions of land identified by the Alaska Department of Fish and Game (ADF&G) and used by the Forest Service for wildlife analysis. WAA's included in the CPOW Project Area are illustrated on Fig. 3-19. Specific VCU's that are included within Project Area WAA's are listed in Table 3-60.

Table 3-60
VCU's Within Wildlife Analysis Areas (WAA's) and Percent of the WAA that the Project Area Includes

WAA	% of WAA in Project Area	VCU's
1315	40	584, 585, 586, 598, 599
1319	25	579, 580, 585, 586
1420	64	572, 581, 582, 583
1421	62	552, 573, 574, 577
1422	73	554, 557, 571, 587, 588, 589, 590
1527	13	549, 550, 551, 553
1530	27	550, 551, 553

Figure 3-19
Wildlife Analysis Areas



WAA'S
Wildlife Analysis Areas (WAA's) are divisions of land designated by the Alaska Dept. of Fish & Game and used by the Forest Service for wildlife analysis.

Wildlife Habitats

Habitat is the type of environment that provides the essentials for a species to survive and reproduce successfully. The environment can be described in physical or biological terms, which often includes elevation, topography, or type of vegetative community. A species may occupy a range of different habitats or more than one distinct kind of habitat in different seasons. Terrestrial habitats inventoried in the CPOW Project Area include:

- Beach fringe
- Estuary fringe
- Riparian
- Forest
  - Old-growth forest
  - Second-growth forest
- Alpine/subalpine
- Open Muskeg (Peatlands)

A brief description of these habitats follows. Table 3-61 displays an acreage inventory of each habitat by Wildlife Analysis Area (WAA). A summary of percentages of the Project Area included in each terrestrial habitat type is shown in Figure 3-20. Note that because several categories overlap each other (e.g., "Beach Fringe" may contain some "old-growth" and some "riparian" habitats), the sum of the total acres will not be the same as the total acreage announced for the Project Area. MIS wildlife species use of each habitat type is shown in Figure 3-21.

Wildlife habitats provide essential food, water, shelter, and other environmental conditions necessary for survival and reproduction.

Table 3-61

Wildlife Habitats in the CPOW Project Area, 1992 (by Wildlife Analysis Area), in Acres*

WAA	Beach Fringe	Estuary Fringe	Old-Growth Forest	Second Growth Forest	Non-commercial Forest	Total Forest	Alpine Subalp	Riparian	Open Muskeg
1315	4,428	2,024	24,756	14,568	537	41,054	458	9,891	2,110
1319	0	1,558	9,930	6,076	707	16,607	2,587	5,885	2,607
1420	468	580	16,149	11,270	457	29,432	3,642	9,110	3,264
1421	1,144	204	30,706	12,137	477	44,586	1,781	14,068	4,726
1422	2,766	1,714	40,148	29,259	2,607	72,207	2,746	28,156	10,398
1527	408	6	2,398	1,137	0	3,642	0	1,194	1,861
1530	736	312	8,666	4,079	110	12,836	0	5,784	3,393
Total	9,950	6,398	132,753	78,526	4,895	220,364	11,214	74,088	28,377

*Certain categories overlap. For example, old-growth and second-growth forest are also included in beach fringe and estuary fringe habitats.

Figure 3-20
Wildlife Habitats in CPOW Project Area (percentage)

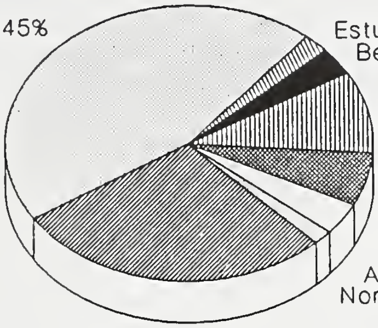


Figure 3-21
Principal Habitats Used by Management Indicator Species

SPECIES	HABITATS: Beach Fringe	Estuary Fringe	Riparian	Old Growth	Alpine/Subalpine
Sitka Blacktailed Deer	✓	✓	✓	✓	✓
Black Bear	✓	✓	✓	✓	✓
Otter	✓	✓	✓	✓	
Marten	✓	✓	✓	✓	
Brown Creeper				✓	
Hairy Woodpecker				✓	
Vancouver Canada Goose		✓	✓	✓	✓
Bald Eagle	✓	✓	✓	✓	
Gray Wolf	✓	✓	✓	✓	✓

Beach Fringe

This category includes land lying within 500 feet of the mean high tide and excludes estuarine habitat units. Areas within 500 feet of the ocean shoreline are transitional zones between land and water, salt and freshwater, and vegetated and nonvegetated conditions (USDA Forest Service 1979a). Forested areas in this transitional zone are heavily used by species with high economic, recreational, subsistence, or aesthetic values. Black bear, river otter, bald eagle, marten, black-tailed deer, and Vancouver Canada goose concentrate their activities during some seasons in these forest stands. Many of these species exhibit a strong association with old-growth forest stands. No alternatives in the CPOW EIS propose any timber harvest within beach fringe.

Estuary Fringe

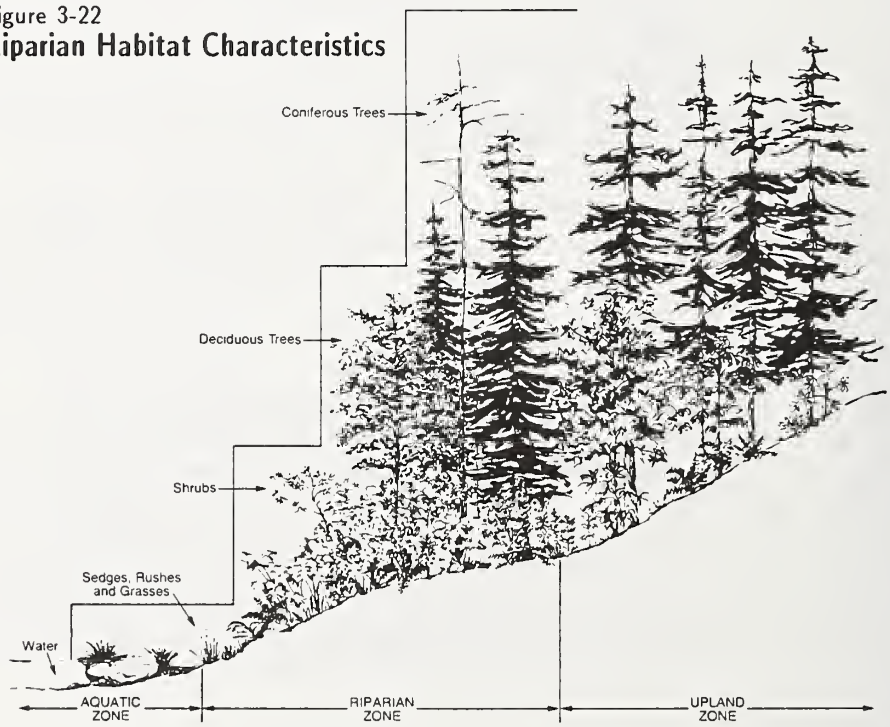
Estuaries are deepwater tidal habitats and adjacent tidal wetlands in which ocean water is occasionally diluted by freshwater runoff from the land. Estuary fringe habitat is a 1,000-foot zone around estuaries. The estuary fringe areas are identified to quantify alteration of that habitat. The estuary fringe is similar to beach fringe, but because of species diversity, it has a greater value to wildlife, especially black bears, river otters, mink, bald eagles, and waterfowl. No harvest is proposed for harvest within the estuary fringe.

Riparian

The riparian habitat is recognized as some of the most diverse and productive habitat in Southeast Alaska. It occurs along rivers and streams or around inland lakes, and contains elements of both aquatic and terrestrial ecosystems. Many wildlife species use riparian zones disproportionately more than other areas (USDA Forest Service 1985), and Project Area riparian habitats are extremely important for eagles, furbearers, and black bears (USDA Forest Service 1986a). Riparian areas are important migration routes for some wildlife species, and serve as travel routes for numerous species because of the presence of water, food, and cover.

For the purpose of this section, riparian habitat was quantified by Class I and II stream and lake AHMU zones. (This is more expansive than the definition of riparian areas based on soil types, which was used in the Soils section of this chapter, in order to more accurately reflect wildlife use of riparian habitats.) Alternatives described in this EIS do not propose any harvest adjacent to Class I or II streams or lakes larger than 5 acres; the width of all proposed buffer strips is at least 100 feet. For additional information regarding Riparian Area management, see the Soils and Fisheries sections of this chapter.

Figure 3-22
Riparian Habitat Characteristics



Riparian zones are transitional between aquatic and upland zones (which include forested wetlands). They provide water, food, and cover important for many wildlife species.

Forest

Forest habitat includes all areas with forest cover, including old growth and second growth described below, and noncommercial forest land as described in the Timber and Vegetation section of this chapter. Many wildlife species, including those associated with old-growth stands, use all forested areas within the Project Area.

Old-growth Forest

Old-growth forest is characterized by stands of trees usually well past the age of maturity with declining growth rates and signs of decadence, such as dead and dying trees, snags, and downed woody material. The stand usually includes large diameter trees, multi-layered canopies, a range of tree diameter sizes, and the notable presence of understory vegetation. These and other characteristics make old-growth forests important habitat for Sitka black-tailed deer, martens, black bears, and cavity nesting birds such as the hairy woodpecker. These forests are in a dynamic, steady state where the death of old trees is balanced by the growth of new trees. Old-growth forest acres are also included in beach fringe, estuary fringe, riparian, and other habitat areas. For a more detailed discussion of old-growth vegetation, see the Old-growth and Biodiversity section of this chapter.

Second-growth Forest

Second-growth forest is defined for the purposes of this section as consisting mostly of areas that have been commercially clearcut. Large-scale second-growth stands are of lower value to wildlife such as deer, martens, bears, and cavity nesters because conifer seedlings aggressively invade and eventually shade out desirable herbaceous vegetation. This habitat type was inventoried to help display the amount of past timber harvest activity that has occurred within the CPOW Project Area.

Alpine/Subalpine

The alpine category includes areas at or above treeline, including unvegetated areas of permanent snow and ice; open meadows of grasses, forbs, and shrubs; and scrub forest (Sidle and Suring 1986). Subalpine habitat includes a mosaic of forested, scrub, and unforested stands that occur at higher elevation than the upland forest, at the lower edge of the alpine zone (Sidle and Suring 1986). Alpine/subalpine habitat within the CPOW Project Area is generally above 2,000 feet in elevation. These habitats are important summer foraging areas for deer and black bears.

Open Muskeg (Peatlands)

Muskegs are most often characterized by stunted yellowcedar and shore pine, along with sedges and other bog vegetation. Muskegs dominated by sphagnum moss or tall sedge cover smaller areas. The water table is at the surface, and numerous small ponds are scattered throughout the muskeg.

Southeast Alaska muskeg.

Wildlife Habitat Capability Models

Wildlife models were used to calculate rough population estimates, based on habitat capability, for each Management Indicator Species (MIS) in the project. For specific information on the models used, see Appendix B of the TLMP Draft Revision. Because of the amount of timber harvest on private land, a worst-case scenario was assumed, and no habitat capability was calculated for inclusions of state, private, or encumbered lands (see Land Status section of this chapter) within the Project Area. The cumulative effects section for the reasonably foreseeable future in the Subsistence section included activities occurring outside of the Project Area, and the deer habitat capability of other ownership was estimated.

> *"The terms 'habitat capability' and 'population' are not interchangeable.... Habitat capability values are not intended to reflect actual populations, but are used to compare the alternatives."*

The terms "habitat capability" and "populations" are not interchangeable. Habitat capability is synonymous with average carrying capacity or the estimated number of animals the habitat can potentially support during a typical year. Population is the estimated number of animals actually present at a given time. Populations may temporarily exceed habitat capability (for example, due to a series of mild winters). However, many populations are frequently below what the habitat is capable of producing, due to predation, winter mortality, or other ecological factors.

Given data limitations, the complexity of ecological relationships, and the need to simplify variables for use in the models, actual population sizes in some areas may vary considerably from those predicted by the analysis. However, the procedures provide the best available estimate of habitat capability. The habitat capability values are not intended to reflect actual population densities in the Project Area, but are used in relative comparisons of the alternatives.

Table 3-62 presents the estimated wildlife habitat capabilities within the CPOW Project Area. Changes since 1954 are a "worst case" scenario since all previous harvest was assumed to be volume class 6. In reality, some stands may have been vol. class 4 or 5.

Table 3-62
Wildlife Habitat Capability within the CPOW Project Area

Selected MIS	1954*	1993**	Percent Change
Sitka black-tailed deer ***	14,942	10,245	-31
Marten ***	671	499	-26
Black bear	552	517	- 6
Bald eagle	518	375	-28
River otter	192	168	-12
Hairy woodpecker ***	7,725	3,395	-56
Brown creeper ***	17,725	5,594	-68
Vancouver Canada goose	902	667	-26
Gray Wolf ***	33	25	-24

* Habitat Capability for just the portion of WAA's in the Project Area.
** This habitat capability was calculated assuming all units in LTS 89/94 were harvested. For estimated habitat capabilities assuming no harvest of remaining 89-94 units, see Effects of the Alternatives portion of this section.
*** This habitat capability was calculated without patch size, or road density effects.
SOURCE: Matson 1993. Data derived from GIS data base and interagency habitat capability models.

Sitka Black-tailed Deer

The Sitka black-tailed deer was chosen as an MIS because it is an important game and subsistence species and is seasonally associated with old-growth forests.

Historically, population fluctuations of Sitka black-tailed deer in Southeast Alaska have been linked with winter severity (Merrian 1970) and predation pressure (Van Ballenberge and Hanley 1984). Deep snow and late springs associated with severe winters have occurred several times in the past 80 years. Deer die-offs are common during severe winters, even in the best old-growth winter ranges. Predators of deer—gray wolves, bears, and hunters—contribute to the population decline during these winters, inhibiting subsequent recovery of the deer population.

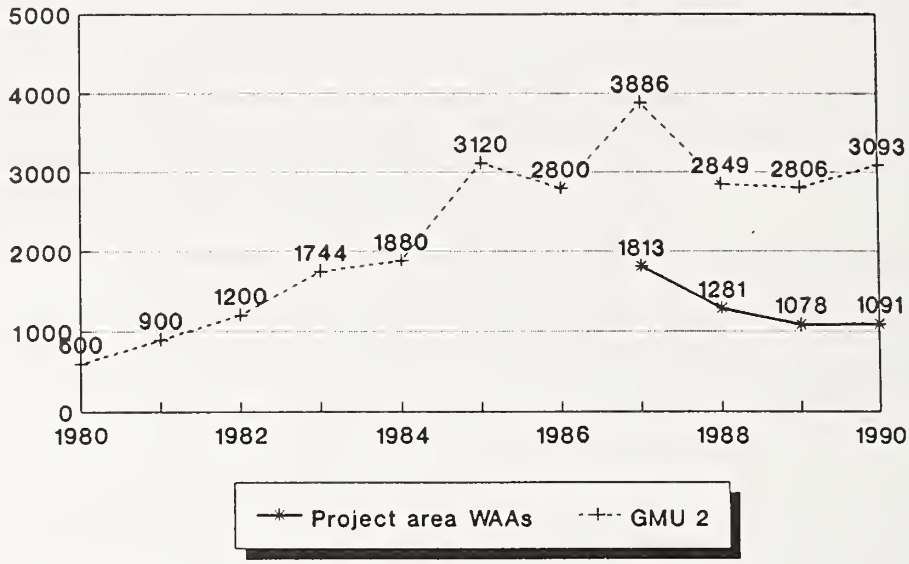
In general, winter severity increases with latitude and with maritime influence in Southeast Alaska (Longhurst and Robinette 1981); consequently, winters tend to be less severe on Prince of Wales Island than in northern and eastern sections of Southeast Alaska. In most cases, timber harvest of deer winter range reduces the long-term quality of deer winter range. The combination of deep-snow winters and large amounts of deer winter range converted to second-growth compounds effects on deer populations. Snow significantly reduces forage availability in clearcuts during the winter. Closed-canopy second-growth stands provide little forage in winter or summer. The amount of second growth and winter severity are key factors in determining the capability of the land to support deer populations. Within the Project Area, VCU's 551, 552, 557, 572, 577, 582, 583, 585, 586, 587, and 599 have low snow ratings; VCU's 549, 550, 553, 554, 571, 573, 574, 579, 580, 581, 584, 588, 589, and 598 have moderate snow ratings; and VCU 590 is rated as deep snow for the deer habitat capability model.

Research conducted near Juneau, Alaska, indicates that high volume, old-growth forests at lower elevations are essential to maintaining deer populations during severe winters (Schoen et al. 1985; Klein 1965; Hanley and Rose 1987). Large, strong branches characteristic of the old-growth stands intercept snow, providing for deer mobility while maintaining available forage. High volume stands of old-growth forests support adequate herb and shrub layers of deer forage.

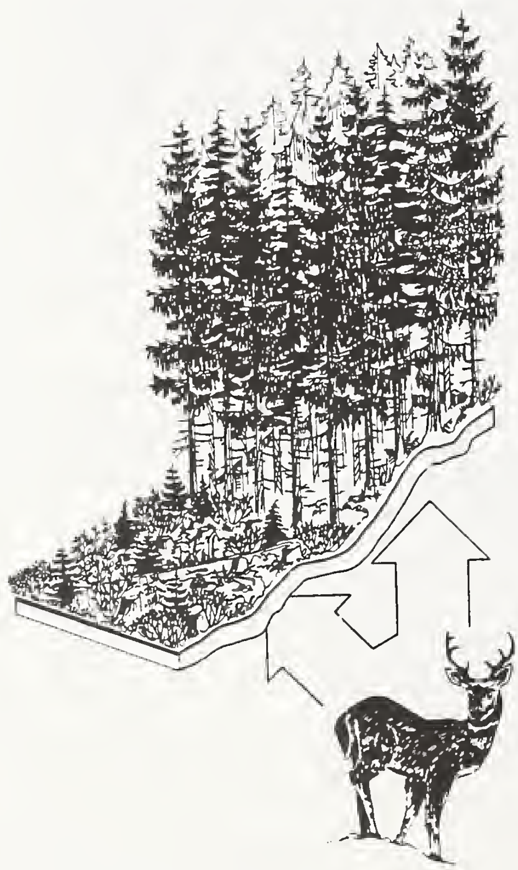
Deer populations on Prince of Wales Island gradually have been rebuilding from the effects of hard winters during the late 1960's and early 1970's. Populations have recovered to the point where antlerless seasons similar to those of the 1950's, 1960's, and 1970's could safely be reinstituted (Population Objectives, ADF&G 1991).

Deer harvest in Game Management Unit 2 (which includes Prince of Wales Island and all the outer islands that form the Prince of Wales Archipelago) has gradually been increasing from the early 1980's to 1985. Since 1985, the reported harvest has fluctuated from a low of 2,800 in 1986, to a high in 1987 of 3,886 (see Figure 3-23).

Figure 3-23
Deer Harvest in Game Management Unit 2 and the Project Area WAA's, 1980-1990



SOURCE: Matson 1992. Data compiled from ADF&G harvest data.



An interagency model was developed to evaluate the potential quality of winter habitat for Sitka black-tailed deer. Winter is assumed to be the most limiting season for the Sitka black-tailed deer throughout the area (Hanley and McKendrick 1985, cited by Suring et al. 1991). The deer model incorporated the following factors in the analysis: (1) snow conditions, (2) presence of predators, (3) physiographic features including aspect and elevation, and (4) stand size including: (a) volume class of old growth, (b) forest type, (c) second growth (25–150 years), and (d) clearcut (0–25 years).

Results of the deer model indicate habitat existing in 1993 in the CPOW Project Area is capable of supporting an estimated 10,245 deer, assuming all previous harvest was vol. class 6 and 7 (worst case) (Table 3-62). This represents a 31 percent reduction in habitat capability since the start of the KPC contract in 1954 because of timber harvest. Table 3-63 shows habitat capability by WAA at current conditions and before 1954.

Results of the deer model indicate that the CPOW Project Area has existing habitat in 1993 capable of supporting an estimated 10,245 deer.

Table 3-63
Deer Habitat Capability* by WAA, 1954 and 1993

WAA	1954 Hab. Cap.**	1993 Hab. Cap.**
1315	3,705	2,161
1319	906	509
1420	1,877	966
1421	2,714	2,139
1422	4,492	3,552
1527	307	231
1530	941	687
TOTAL	14,942	10,245

* This habitat capability does not include patch size effects.
** Habitat capability is for the portions of the WAA's within the Project Area. Changes from 1954 assume all previous harvest was vol. class 6 and 7 (worst case).
SOURCE: Matson 1993. Data derived from GIS data base and Suring et al. 1988.

Marten

The marten was selected as an MIS to represent old-growth associated species and because it is an important furbearer. Marten populations are moderate in the Project Area. Trapping pressure is high due to the concentration of roads in the Project Area. High pelt prices, susceptibility to trapping pressure, liberal trapping regulations, and easy access to new trapping areas has created a large demand for marten.

Martens prefer mature old-growth forests with a well developed overhead canopy. Most snags and downed woody debris are important to martens for winter and summer dens and resting sites, and for cover for prey species. The distribution and abundance of martens is determined to a large extent by the availability of cover and the presence of prey species (Simon 1980).

Throughout the year, especially in the winter, small mammals are an important food source for martens. During the summer their diet is supplemented by birds, insects, fruits, and berries.

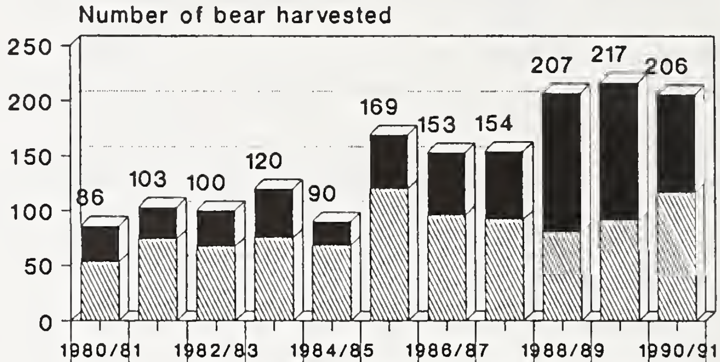
The model was developed to evaluate the potential quality of winter habitat for the marten (Suring et al. 1988a). The underlying assumption is that if adequate winter habitat is available, habitat requirements throughout the rest of the year will not be limiting. The model incorporated the following factors in the analysis: (1) classes of timber volume in old-growth forests, (2) stand size classes (stand age), (3) beach fringe habitat, (4) riparian habitat, (5) elevation, (6) road density, and (7) patch size (see the Biodiversity section for effects of patch size).

The marten model indicates there is habitat capable of supporting an estimated 499 martens in the CPOW Project Area, assuming previous harvest was all volume class 6 and 7 (worst case) (Table 3-62). This is a 26 percent decline from 1954 habitat capability.

Black Bear

The black bear was selected as an MIS to represent estuarine habitat and because it is an important game species. Black bears occur thoughout the Project Area and populations are currently stable, but they have experienced a dramatic increase in harvest levels during the past couple of years (D.Larsen ADF&G Pers. Comm. Figure 3-24). As of the 1990/91 black bear harvest season, nonresident hunters have been limited to one black bear, while Alaska residents can still harvest two black bear.

Figure 3-24
Black Bear Harvest in Game Management Unit 2, by Hunter Residency



Non-residents	33	29	33	45	22	49	57	62	127	126	89
Alaskan residents	53	74	67	75	68	120	96	92	80	91	117

Alaskan residents   Non-residents

SOURCE: Matson 1992. From ADF&G harvest data compiled by Doug Larsen, Area Wildlife Biologist

Black bears are highly adaptable and can tolerate moderate disturbances, such as habitat alteration, as long as the basic requirements for food and cover are satisfied (Lawrence 1979). As clearcut stands mature, both forage resources and numbers of denning sites may decline.

After emergence from dens in the spring, black bears seek sources of new plant growth for food (Mondafferi 1982). Grass flats of estuaries, low elevation forests near the beach (beach fringe habitats) and avalanche slopes provide the needed high quality forage. Estuaries receiving heavy spring bear use include the Thorne Bay, Exchange Cove, Barnes Lake, and Sweetwater Lake areas. During the summer, black bears feed on forbs, berries, and salmon. In the fall they feed on berries and forbs (Sidle and Suring 1986) in the subalpine areas. The Thorne River, Hatchery Creek, and Staney Creek areas are important travel corridors and feeding areas during the salmon runs.

Bear den sites include: (1) cavities in trees and stumps, (2) caves, and (3) excavated and natural depressions under tree roots, stumps, and fallen logs. The characteristics of preferred den sites in Southeast Alaska—hollow logs and trees in dense shrub growth—are typically associated with old-growth forests (Erickson et al. 1982). Black bears search for food in clearcuts that provide access to cover, which is found in

mature and old-growth forests. Clearcuts 10 to 15 years old are preferred because of the production of large amounts of berries (Lindzey and Menslow 1977).

The model for black bears incorporated the following factors in the analysis: (1) the average seasonal value of upland habitats, (2) the average seasonal value of riparian habitats and potential salmon production, and (3) the average seasonal value of beach fringe habitats. For more information regarding the model see: Suring et al. 1988b.

The black bear model indicates the habitat is capable of supporting an estimated 517 black bears in the CPOW Project Area (Table 3-62). This is a 6 percent decline from the pre-1954 habitat capability, assuming all previous harvest was vol. class 6 and 7 (worst case).

Bald Eagle

The bald eagle was selected as an MIS because the public has a strong interest in the species and the species has special habitat requirements. Bald eagle habitat is defined as beach fringe habitat. The majority of eagles in Southeast Alaska nest in coniferous forest habitats along the coastline and associated saltwater inlets (Suring et al. 1988c). Eagles prefer to nest in continuous stands of old-growth rather than in narrow leave strips of old-growth trees. Of the 3,850 nests surveyed in Southeast Alaska, 92 percent were within 300 feet of the shoreline (Hodges and Robards 1982).

Bald eagles nest adjacent to the habitat that provides the best opportunities for foraging or searching for food, such as over open water and on tidal flats. Eagles primarily feed on fish, but are also known to feed on waterbirds, marine invertebrates, and drifting carrion. Perching sites near the nest and foraging areas are also important components of bald eagle habitat. The bald eagle and its habitat have been given special protection through an Interagency Agreement between the Forest Service and the U.S. Fish and Wildlife Service (USDA Forest Service and USDI Fish and Wildlife Service 1990), and by the Bald Eagle Protection Act. Among the provisions of the Interagency Agreement are: requirement of a 330-foot buffer of no timber harvest around eagle nests, timing for blasting within 1/2 miles of eagles nests,

Bald eagle habitat includes open water and intertidal areas for feeding, and adjacent forest areas for perching and nesting.

and a requirement that formal consultation with the Fish and Wildlife Service take place when any portion of the MOU cannot be implemented. The U.S Fish and Wildlife Service has identified 80 nest sites in the CPOW Project Area. Table 3-64 displays the number of identified eagle nests which occur in each WAA.

Table 3-64
Number of Eagle Nests by WAA

WAA	# Nests
1315	28
1319	0
1420	13
1421	6
1422	20
1527	5
1530	8
TOTAL	80

SOURCE: Matson 1992. Data derived from GIS data base.

The model evaluated only the nesting habitat of bald eagles because limited information is available on the winter habitats and movements of bald eagles in Southeast Alaska (Suring et al. 1988c). The model considered the following factors in the analysis: (1) old-growth forest, (2) volume class, (3) distance from shore, and (4) elevation of riparian habitat.

The model indicates there is suitable nesting habitat capable of supporting an estimated 375 eagles (Table 3-62). This is a 28 percent decline from the pre-1954 habitat capability, assuming all previous harvest was vol. class 6 or 7 (worst case).

River Otter

The river otter was selected as an MIS to represent riparian habitats and because it is an important furbearer.

River otters concentrate along intertidal zones and the adjacent narrow beach fringe. They also travel extensively throughout streamside habitats. The old-growth forests in Southeast Alaska are assumed to provide optimum habitat for river otters (Suring et al. 1988d), with seedling and sapling (i.e., clearcut) and pole timber stands providing limited habitat. Otters avoid clearcuts extending to the beach in Southeast Alaska (Larsen 1983) because of lack of cover and density of shrub growth. High value otter habitat must provide adequate shelter in addition to sufficient food (Melquist and Hornocker 1983). River otters feed on fish (primarily sculpins and rockfish), crabs, and occasional invertebrates other than crabs (Sidle and Suring 1986).

River otters depend on large woody debris (LWD) in streamside, lakeside, and beach habitats. The large extensive root systems, downed tree trunks, and overturned root wads of old-growth trees create undercuts and hollows that maintain den and resting sites, and cover. From May through July, female otters use old-growth habitats near

streams for inland (up to 0.5 miles from the coastline) dens. The annual harvest of river otter on the Tongass National Forest has varied from a high in 1979-80 of 652 animals, to a low of 373 animals in the 1986-87 harvest season. Harvest numbers are a function of both otter abundance and trapper effort.

Habitat capability for this species was determined for spring (May through July) because river otters make use of all occupied habitats at this time of year (Suring et al. 1988d). The model incorporated the following factors in the analysis: (1) distance from salt water, (2) beach, (3) estuary, (4) elevation of riparian habitat, (5) volume class, (6) stream class, and (7) lake size.

The model indicates that habitat for river otter in the CPOW Project Area is capable of supporting an estimated 168 otters (Table 3-62). This is a 12 percent decline in habitat capability from the pre-1954 habitat capability, primarily due to past harvest activity, assuming previous harvest was vol. class 6 or 7 (worst case).

High value otter habitat must provide adequate shelter in addition to sufficient food.

Hairy Woodpecker

The hairy woodpecker was chosen as an MIS representing cavity users because of its preference for stands of old-growth western hemlock and Sitka spruce, and for its association with snags (standing dead trees). Hairy woodpeckers are year-round residents in Southeast Alaska and use snags and partially dead trees for nesting and foraging. These woodpeckers feed on larvae of wood-boring beetles, other insects, and seeds and berries in winter (Sidle and Suring 1986).

The hairy woodpecker is important as a primary cavity excavator because by drilling holes in trees it creates habitat needed for other wildlife species (Kesseler 1979; Noble

and Harrington 1978). Forty-two species of mammals and birds in Southeast Alaska nest or den in tree cavities. Included are woodpeckers, owls, hawks, waterfowl, bats, squirrels, martens, and otters. Several of these species depend exclusively on cavities in the large diameter snags characteristic of old-growth stands for nest and den sites. Most cavity nesting or denning species would be represented by hairy woodpeckers and respond similarly to proposed activites.

Hairy woodpecker habitat is defined as volume class 4–7 stands below the subalpine zone. Availability of suitable winter habitat for roosting and foraging is considered an important constraint on the habitat suitablity of the hairy woodpecker. The model (Suring et al. 1988e) incorporates the following factors in the analysis: (1) old-growth forests; (2) volume class; and (3) patch size.

The model indicates there is suitable winter habitat in the CPOW Project Area to support an estimated 3,395 hairy woodpeckers (Table 3-62). This is a 56 percent decline from the pre-1954 habitat capability, assuming previous timber harvest was all vol. 6 or 7 (worst case).

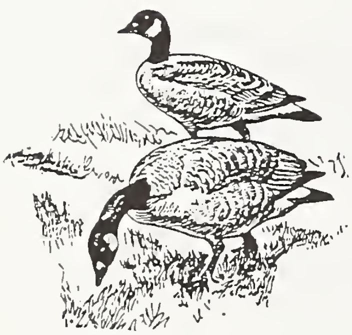
Brown Creeper

The brown creeper was chosen as an MIS because it is associated with large, old-age trees and represents the old-growth forest community. The diet of brown creepers consists of larvae, pupae, and eggs of insects gleaned from the crevices of bark; spiders; other small invertebrates; and occasionally seeds (Pearson 1923, Reilly 1968). Large diameter trees are preferred because a bird can feed longer on a large tree and capture more prey per visit (Airola and Barrett 1985). Brown creepers and other bark foraging birds also select larger diameter trees as foraging sites during cold, windy weather to lessen their exposure (Willson 1970, Grubb 1975, Webber 1986).

The abundance of large coarse-barked trees and the length of the vertical foraging height appears to affect the territory size (Apfelbaum and Hanley 1977); the area necessary to support the birds increases as the number of large, tall trees decreases. Brown creepers spend most of their time foraging on live parts of trees rather than dead trees (Morrison et al. 1987).

Brown creeper habitat is defined as volume class 6 and 7. Slightly more than one tenth of the number of brown creepers observed in stands with 30,000 board ft. per acre were observed in stands with 20-30,000 board ft. per acre (i.e., volume class 5) (Hughes 1985). Other habitats in Southeast Alaska were not considered to provide suitable habitat for brown creepers.

The model indicates there is suitable habitat in the CPOW Project Area to support an estimated 5,594 brown creepers (Table 3-62). This is a 68 percent decline from the pre-1954 habitat capability, assuming previous timber harvest was all vol. class 6 and 7 (worst case).



Vancouver Canada Goose

The Vancouver Canada goose was selected as an MIS to represent old-growth and riparian habitats. The Vancouver Canada goose is also a game species.

Banding studies have indicated Vancouver Canada geese are primarily nonmigratory (Ratti and Timm 1979) and are found almost exclusively in Southeast Alaska. These geese use forested habitats for nesting and brood rearing: they build nests in trees,

use trees for perches during incubation, and rely primarily on forest understory plant species for food during this part of their life cycle (Doyle et al. 1988). Lebeda and Ratti (1983) suggest that the three most important factors for nesting Vancouver Canada geese are: (1) dense understory vegetation, (2) forest surface water, and (3) an abundant food source. The Vancouver Canada goose is solitary by nature and avoids disturbance. For this reason, habitat within 330 feet of open roads is not considered suitable.

For analysis of Vancouver Canada goose habitat suitability, the following habitats were selected: estuaries, anadromous streamsides, and lakesides. Muskegs are also important habitats for the geese, but cover such numerous acres of the Project Area that they are not a limiting factor; muskegs therefore were not included in the habitat analysis for this species.

The model indicates there is suitable habitat in the CPOW Project Area capable of supporting an estimated 667 Canada geese (Table 3-62). This is a 26 percent decline from the pre-1954 habitat capability, assuming previous timber harvest was all vol. class 6 and 7 (worst case).

Gray Wolf

The gray wolf was selected as an MIS species because of concerns expressed by the public as to what effects additional timber harvest and higher road densities would have on the wolf population within the CPOW Project Area.

Gray wolves do not exhibit a preference for specific habitats or habitat characteristics (Paradiso and Nowak 1982). The presence and well being of gray wolves appears to depend on the availability of prey rather than land form, climate or vegetation.

A review of the population dynamics of gray wolves demonstrated that rates of increases are primarily determined by the availability of ungulate prey (Keith 1983). Packard and Mech (1980) concluded that intrinsic social factors and the influence of the food supply are interrelated in determining population levels of gray wolves. It has been demonstrated that predation by gray wolves sustains declines in ungulate populations that have been initiated by other factors (e.g., severe weather, habitat change) (Mech and Karns 1977, Nelson and Mech 1981, Gasaway et al. 1983, Van Ballenberghe and Hanley 1984, Smith et. al. 1986).

Prey species available to gray wolves in Southeast Alaska include Sitka black-tailed deer, moose, mountain goat, beaver, and spawning salmon. Of these species, deer, beaver and spawning salmon are the primary prey in the Project Area.

The habitat capability model developed for wolf primarily runs off the habitat capability model outputs of the deer, moose and mountain goat models. The gray wolf habitat capability model estimates the CPOW Project Area can currently support approximately 25 wolves (Table 3-62). This is a 24 percent reduction from the pre-1954 habitat capability, assuming previous timber harvest was all vol. class 6 and 7 (worst case).

Effects of the Alternatives

This analysis considers the direct, indirect, and cumulative effects of timber harvest in the Project Area. Effects are projected to 1996, the anticipated completion of the current proposed action; to 2004, which includes the reasonably forseeable future and the end of the KPC Long-term Sale Contract; to 2040, to show the cumulative impacts of past, proposed, and what TLMP has scheduled for harvest; and 2140, to show the cumulative impacts of harvesting all the suitable and available lands through the first rotation and half way through the second.

Direct and Indirect Effects

Comparison of Alternatives: Effects on Wildlife Habitat

Each action alternative unavoidably includes harvest of wildlife habitat. Project unit design criteria, BMP's (FSH 2509.22, 1991), and/or legislated protective measures (TTRA) significantly reduce the impacts to beach fringe, estuary fringe, and riparian habitats in each alternative. Alpine/subapine habitat is also affected very little by road and unit location because of inaccessibility and/or low productivity. Project Area-wide changes in these habitats are one percent or less for each alternative (Table 3-65). Impacts to MIS dependent on these habitats are similarly low. Alternatives 1 and 1a, the no-action alternatives, will harvest no acreage, with the effect that existing wildlife habitats will remain at current levels, with changes over time due only to natural succession or other ecological events.

Table 3-65
Acres and Percent of Wildlife Habitats Proposed for Harvest, by Alternative

	Existing Acres	Alt. 1 Acres Cut	Alt. 1 % Chg	Alt. 1a Acres Cut	Alt. 1a % Chg	Alt. F2 Acres Cut	Alt. F2 % Chg	Alt. F3 Acres Cut	Alt. F3 % Chg	Alt. F4 Acres Cut	Alt. F4 % Chg	Alt. F5 Acres Cut	Alt. F5 % Chg	Alt. F6 Acres Cut	Alt. F6 % Chg
Beach Fringe	9,950	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Estuary Fringe	6,398	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Riparian	74,088	0	0	0	0	602	<1	315	<1	635	<1	615	<1	786	1
Old Growth	132,753	0	0	0	0	9,373	7	9,519	7	9,180	7	9,836	8	9,345	7
Alpine/Subalp.	11,214	0	0	0	0	42	<1	33	<1	34	<1	42	<1	36	<1

SOURCE: Matson 1993. Data derived from GIS data base.

Beach Fringe. None of the alternatives proposes any timber harvest within the 500-foot beach fringe zone.

Estuary Fringe. None of the alternatives proposes any timber harvest within the 1,000-foot estuary fringe zone.

Riparian. Acreages listed in Table 3-65 represent the maximum potential harvest as many of the acres are in partial cut areas which may or may not be harvested. Alternative F3 harvests the least number of acres (315). Alternatives F2, F4 and F5 harvest roughly the same amount (602-635 acres); and Alternative F6 harvest 786 acres in the Riparian Area.

Management Indicator Species (MIS)

Wildlife Management Indicator Species (MIS) for the CPOW EIS are:

- ✔ Sitka Black-tailed Deer
- ✔ Marten
- ✔ Black Bear
- ✔ River Otter
- ✔ Gray Wolf
- ✔ Bald Eagle
- ✔ Hairy Woodpecker
- ✔ Brown Creeper
- ✔ Vancouver Canada Goose

For a list of fish MIS, see the Fisheries section of this chapter.

Old-Growth Forest. Most of the productive forested area in the Project Area is old-growth timber. Within some harvest units are scattered patches of nonforested or low productivity forest types. The biggest difference among the alternatives is the total number of acres scheduled for harvest for each particular alternative. Alternatives F2, F3, F4, and F6 each harvest 7 percent of the existing old-growth forest. Alternative F5 harvests 8 percent. The effects of old-growth habitat loss on old-growth associated species are reflected in "Habitat Capability for MIS" later in this section.

Alpine/Subalpine. All of the action alternatives propose about the same level of timber harvest for alpine/subalpine habitats (33 to 42 acres).

Comparison of Alternatives: Effects on Habitat Capability

The previous section discusses changes to wildlife habitats used by the MIS. This section discusses how those changes in habitats affect the potential habitat capability for each MIS. As mentioned in the Affected Environment earlier in this section, the models that estimate the capability of habitats to support selected species are not necessarily accurate reflections of actual populations in the Project Area. Actual population levels are not known at this time. However, effects on habitat capability as projected by the models are considered adequate information on which to make a decision regarding alteration of habitats and the subsequent effects on wildlife populations.

Adequate habitat capable of supporting viable wildlife populations in the North Central Prince of Wales Ecological Province (TLMP Draft Revision, 1991a) is maintained with each alternative. Increased access could increase harvest of martens, black bears, and wolves through increased pressure from hunting and trapping. Since the Project Area is accessible by communities on Prince of Wales Island via the road system and by other Southeast Alaska communities via the Alaska Marine Highway System, an access management strategy will be used to mitigate potential effects of increased hunter pressure. Road management objectives will be implemented on a road-by-road basis depending on resource values and other management activities.

Several MIS show a habitat/use relationship with the size of preferred habitats. The wildlife models for this analysis do not take into account those patch size relationships, but still provide an effective comparison between alternatives. The potential effects of patch size and human developments are included in Figures 3-4 through 3-6, in the Old-Growth and Biodiversity section of this chapter and in Appendix F. Direct impacts to black bears, otters, and bald eagles have been greatly reduced in all action alternatives through avoidance of timber harvest in beach fringe, estuary fringe, stream corridors, riparian, and alpine/subalpine habitats.

Alternative 1 would have no direct effect on habitat capabilities for any MIS. Tables 3-66 through 3-75 display the changes in habitat capabilities, measured against Alternative 1, that would occur under Alternatives 1a through F6.

Sitka Black-tailed Deer. Sitka black-tailed deer are dependent on low elevation, high volume, old-growth stands during severe winters, and are the MIS most affected by proposed timber harvest under the action alternatives. Alternative F5 would decrease habitat capability 3.2 percent in the Project Area while Alternatives F3 and F6 would decrease habitat capability 2.9 percent; Alternatives F2 and F4 show a 3.0 percent decrease (see Table 3-66).

Second-growth canopy closure in timber stands 20 to 30 years after harvest may be delayed by thinning to promote forage production (Hanley et al. 1989). Second-growth forest management has been widely used in Southeast Alaska, but benefits to Sitka black-tailed deer have not been well demonstrated.

Table 3-66
Changes in Habitat Capability for Deer to 1996 by Alt.

	1	1a	F2	F3	F4	F5	F6
Habitat Capability	10,245	10,280	9,934	9,952	9,942	9,918	9,945
Change in Capability	0	+35	-311	-293	-303	-327	-300
Percent Change	0	+<1%	-3.0%	-2.9%	-3.0%	-3.2%	-2.9%

Black Bear. Avoidance of beach fringe, estuary fringe, stream corridors, and riparian habitat with timber harvest is reflected in less than a one percent decline in black bear habitat capability for all action alternatives. All alternatives would harvest habitat capable of supporting an estimated 2 black bears (Table 3-67). The black bear habitat capability of clearcuts is similar to that of old-growth forests because of the large amount of berries produced. The habitat capability for black bears will be reduced by about 4 percent for all action alternatives when the second growth canopy closes and shades out berry producing plants (approximately 25 to 30 years after harvest).

Table 3-67
Changes in Habitat Capability for Black Bear to 1996 by Alt.

	1	1a	F2	F3	F4	F5	F6
Habitat Capability	517	517	515	515	515	515	515
Change in Capability	0	0	- 2	- 2	- 2	- 2	- 2
Percent Change	0	0	-<1%	-<1%	-<1%	-<1%	-<1%

Marten. The marten is an old-growth associated species that uses a wide range of old-growth volume classes, tree species, and landscape positions. Alternative F6 would harvest habitat capable of supporting an estimated 19 martens, for a 3.8% percent decline in habitat capability. Alternatives F2, F4 and F5 would decrease habitat capability about 4 percent. See Table 3-68. Martens are easily trapped and can be overharvested, especially where trapping pressure is heavy (Strickland et al. 1982) and not effectively controlled. Without an access management plan to keep road densities less that 0.5 miles of road per square miles, there could be an additional 85 percent reduction in population levels due to trapping (Figure 3-25). Impacts would be reduced where roads are closed to motorized use following timber harvest or when restrictions are placed on using vehicles for hunting or trapping. Table 3-69 displays the current road densities for the total WAA's that are part of the Project Area, and what the density would be with and without implementing the proposed access management plan.

The road density analysis considered all existing roads. The actual open road density will be lower than the analysis because numerous roads are closed because of natural

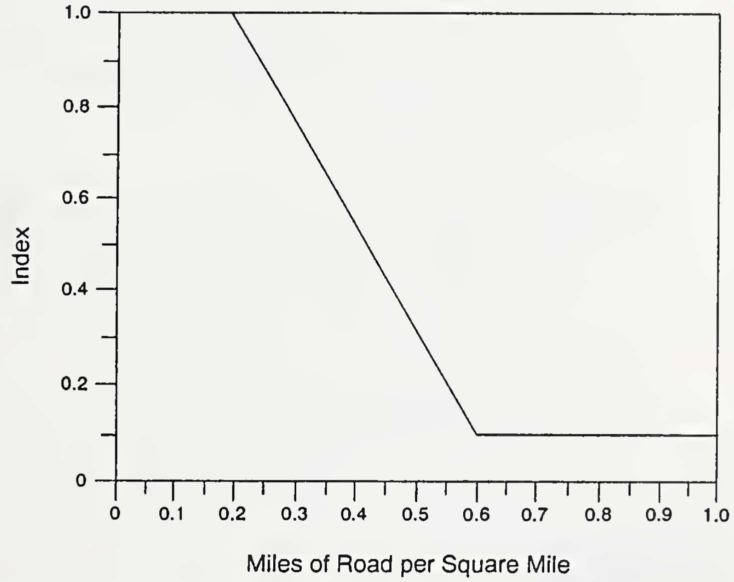
closure by alder growth, culverts or temporary bridges have been pulled, or roads have been deliberately closed by gates or other physical barriers. While the overal road density maybe higher than desired for marten, a majority of the high road density is in areas that have been heavily harvested and is not good marten habitat. Road closures for protection of marten focused in on areas of important habitat.

Table 3-68
Changes in Habitat Capability for Marten to 1996 by Alt.*

	1	1a	F2	F3	F4	F5	F6
Habitat Capability *	499	503	479	476	479	478	480
Habitat Capability**	75	75	72	71	72	72	72
Change in Capability	0	+4	-20	-23	-20	-21	-19
Percent Change	0	+1%	-4.0%	-4.6%	-4.0%	-4.2%	-3.8%

* Without road density effects.
**With road density effects.

Figure 3-25
Hypothetical Effect of Road Density on the Capability of Habitats to Support Marten Without Adequate Safeguards to Prevent Overharvesting



Source: Suring et al. 1988

Table 3-69

Miles of Road for WAA's in the CPOW Project Area, With and Without Implementing an Access Management Plan by Alt.

	1, 1a		F2		F3		F4		F5		F6	
WAA	W/O	With	W/O	With	W/O	With	W/O	With	W/O	With	W/O	With
1315	134	48	161	50	163	51	166	50	159	59	157	50
1319	141	86	155	64	155	79	155	64	158	64	154	64
1420	106	59	120	62	119	61	116	61	119	61	119	62
1421	132	92	140	98	160	98	140	98	140	98	153	100
1422	235	176	273	197	279	196	277	196	279	196	273	192
1527	84	54	84	55	85	55	85	56	85	56	85	55
1530	144	112	159	121	159	117	150	115	148	114	151	114
TOTAL	976	627	1097	647	1120	657	1089	639	1088	648	1092	637
Road * Density	1.1	0.7	1.2	0.7	1.3	0.7	1.2	0.7	1.2	0.7	1.2	.7

* Total Area for all WAA's is 887 square miles.

River Otter. The otter is another species that benefited from measures taken during unit design which limited timber harvest in beach fringe, estuary fringe, stream corridors, and riparian habitat. All action alternatives maintain current habitat capability (Table 3-70).

Table 3-70

Changes in Habitat Capability for River Otter to 1996 by Alt.

	1	1a	F2	F3	F4	F5	F6
Habitat Capability	168	168	168	168	168	168	168
Changes in Capability	0	0	0	0	0	0	0
Percent Change	0	0	0	0	0	0	0

Hairy Woodpecker. The hairy woodpecker is a primary excavator that prefers high volume, old-growth timber, but can also effectively use lower volume stands. Alternatives F2, F3, F4 and F6 would decrease habitat capability 6 percent in the Project Area; alternative F5 would decrease habitat capability by 7 percent (Table 3-71). Hairy woodpeckers may also benefit from snag retention in clearcuts as a mitigation of timber harvest (see Chapter 2).

Table 3-71
Changes in Habitat Capability for Hairy Woodpecker to 1996 by Alt.

	1	1a	F2	F3	F4	F5	F6
Habitat Capability	3,395	3,425	3,181	3,182	3,186	3,172	3,192
Change in Capability	0	+30	-214	-213	-209	-223	-203
Percent Change	0	+<1%	-6%	-6%	-6%	-7%	-6%

Brown Creeper. The brown creeper is highly dependent on large old-growth trees. All action alternatives would remove habitat capable of supporting an estimated 275 (Alt. F6) to 324 (Alt. F5) brown creepers (Table 3-72). Alternative F6 would decrease habitat capability by 5 percent, while Alternatives F2, F3, F4 and F5 would be 6 percent.

Table 3-72
Changes in Habitat Capability for Brown Creeper to 1996 by Alt.

	1	1a	F2	F3	F4	F5	F6
Habitat Capability	5,594	5,673	5,272	5,284	5,279	5,270	5,319
Change in Capability	0	+79	-322	-310	-315	-324	-275
Percent Change	0	+1%	-6%	-6%	-6%	-6%	-5%

Vancouver Canada Goose. The Vancouver Canada goose nests in forested areas in proximity to wetlands and preferred food plants. All action alternatives would harvest habitat capable of supporting an estimate of between 27 (Alt. F2 and F4) and 30 (Alt. F3 and F5) geese in the Project Area (Table 3-73). All action alternatives would decrease habitat capability 4 percent in the Project Area.

Table 3-73
Changes in Habitat Capability for Vancouver Canada Goose to 1996 by Alt.

	1	1a	F2	F3	F4	F5	F6
Habitat Capability	667	670	640	637	640	637	639
Change in Capability	0	+3	-27	-30	-27	-30	-28
Percent Change		+<1%	-4%	-4%	-4%	-4%	-4%

Bald Eagle. Scheduling development activities away from beach fringe, estuary fringe, lake buffers, and Class I and II streams would effectively reduce impacts to bald eagle habitat. Habitat capability decreases less than one percent under all Alternatives (Table 3-74). Management activities within 330 feet of an eagle nest site are restricted by an Interagency Agreement between the Forest Service and the U.S. Fish and Wildlife Service (USDA Forest Service and USDI Fish and Wildlife Service 1990). There are no known nest sites which would require a variance to construct proposed new roads or harvest proposed units.

Table 3-74
Changes in Habitat Capability for Bald Eagle to 1996 by Alt.

	1	1a	F2	F3	F4	F5	F6
Habitat Capability	375	375	374	375	374	374	374
Change in Capability	0	0	-1	-0	-1	-1	-1
Percent Change	0	0	-<1%	- 0%	-<1%	-<1%	-<1%

Gray Wolf. The gray wolf habitat capability model runs off of the Sitka black-tailed deer habitat capability model, since there are not any significant numbers of moose or mountain goats in the Project Area. All action alternatives reduce the habitat capability by approximately one animal (Table 3-75).

Table 3-75
Changes in Habitat Capability for Gray Wolf to 1996 by Alt.

	1	1a	F2	F3	F4	F5	F6
Habitat Capability	25	25	24	24	24	24	24
Change in Capability	0	0	-1	-1	-1	-1	-1
Percent Change	0	0	-4%	-4%	-4%	-4%	-4%

High road densities can increase the human-caused mortality of wolves. In areas receiving high levels of wolf harvest, it is recommended to maintain open road densities of one mile of road per square mile (TLMP Draft Revision 1991a). Table 3-69 displays the total road density for the Project Area WAA's and the road density after the proposed Access Management Plan is implemented. The current road density is 1.1 miles of road per square mile, and the road density after the Access Management Plan is implemented will be 0.7 miles of road per square mile (however, the open road densities will be lower because numerous roads are already closed).

Comparison of Alternatives: Summary

Table 3-76
Summary of Changes in Habitat Capability to 1996 by Alt.

Species	1954	1993	1	1a	F2	F3	F4	F5	F6
Deer	14,942	10,245	10,245	10,280	9,934	9,952	9,942	9,918	9,945
% Change			-31	-31	-34	-33	-33	-34	-34
Black Bear	552	517	517	517	515	515	515	515	515
% Change			- 6	- 6	- 7	- 7	- 7	- 7	- 7
Marten	671	499	499	499	479	479	486	487	486
% Change			-26	-26	-28	-28	-28	-27	-28
Otter	192	168	168	168	168	168	168	168	168
% Change			-12	-12	-12	-12	-12	-12	-13
Hairy Woodpecker	7,725	3,395	3,395	3,425	3,181	3,182	3,186	3,172	3,192
% Change			-56	-56	-59	-59	-59	-59	-59
Brown Creeper	17,725	5,594	5,594	5,673	5,272	5,284	5,279	5,270	5,319
% Change			-68	-68	-70	-70	-70	-70	-70
Vancouver Can Goose	902	667	667	670	640	637	640	637	639
% Change			-26	-26	-29	-29	-29	-29	-29
Bald Eagle	518	375	375	375	374	375	374	374	374
% Change			-28	-28	-28	-28	-28	-28	-31
Gray wolf	33	25	25	25	24	24	24	24	24
% Change			-24	-24	-27	-27	-27	-27	-27

* Percent change is from 1954. Assumes all previous harvest was vol. class 6 and 7 (worst case).
SOURCE: Matson 1992. Data derived from GIS data base and interagency habitat capability models.

Cumulative Effects: Reasonably Foreseeable

Cumulative effects include past harvest, the proposed actions, and timber harvest in the reasonably foreseeable future. TLMP Draft Revision (1991a) projects timber harvest through the full 100-year rotation and half way into the second rotation. This portion of the analysis (reasonably foreseeable) will focus on effects to the year 2004, which is halfway through the rotation and the end of the Long-Term Contract with KPC. The following assumptions were made for projecting the cumulative effects of timber harvest through 2004:

> Approximately 356 MMBF of additional timber will be harvested from the Project Area by the year 2004 to meet contractual obligations.
>
> Future impacts to beach fringe, estuary fringe, stream corridors, riparian, and alpine/subalpine habitats will be similar to those anticipated in the current alternatives.
>
> Future timber harvest decreases the habitat capability for MIS the same percentage as Alternative F5 of CPOW does (because Alternative F5 is the Preferred Alternative). For example, if Alternative F5 (267 MMBF) reduces deer habitat capability by 327, the harvest of another 356 MMBF will reduce the deer habitat capability by another 435 (1.33 X 327 because the next entry will be approximately 1 and 1/3 larger than CPOW's entry).

Habitat Capability for MIS in 2004 and Total Cumulative Impacts in 2040

Decreases in habitat capabilities projected to the end of the Long-Term Contract in 2004 are displayed in Table 3-77. Effects projected from 1996 to 2004 were based on the reduction in habitat capability anticipated for Alternative F5. This took into account the more stringent resource protective measures currently used to design harvest units, and enabled projection of effects without knowledge of exact location of future harvest units.

The total cumulative impacts are also displayed in Table 3-77; this takes into account the effects of canopy closure on units harvested by Alternative F5 and multiplying those impacts by 1.33 to estimate the effects of harvesting an additional 356 MMBF by 2004.

Habitat capabilities for 2040 and 2140 assume all suitable-available timber identified by the TLMP Draft Revision Alt. P will be harvested during this planning horizon. This represents a worst-case scenario, because it is likely that many of these areas will not be harvested for a variety of reasons, including: buffers for as-yet unmapped streams and cave resources, unstable slopes, areas that can't be regenerated, poor economics, and areas that are technically inoperable.

Table 3-77
Reasonably Foreseeable Changes in Habitat Capability, 1954-2004, including Total Cumulative Impacts to Year 2040

Species	Habitat Capability 1954	Habitat Capability 1993	Habitat Capability 2004	Percent Reduction From 1954	Habitat Capability 2040	Percent Reduction From 1954
Sitka black-tailed deer*	14,942	10,245	9,483	36	9,351	37
Black bear	552	517	512	7	468	15
Marten*	671	499	450	33	445	34
River otter	192	168	168	12	168	12
Hairy woodpecker*	7,725	3,395	2,875	63	2,875	63
Brown creeper	17,725	5,594	4,839	73	4,839	73
Vancouver Canada goose	902	667	597	34	597	34
Bald eagle	518	375	373	28	373	28
Gray wolf	33	25	23	30	21	36

Based on Alt.F5, because Alt.F5 is the Preferred Alternative and the volume of 267 MMBF comes close to projected 356 MMBF volume for next CPOW entry. Changes from 1954 assume all previous harvest was vol. class 6 and 7 (worst case).

*Does not consider effects of forest fragmentation or road densities.

SOURCE: Matson 1993. Data derived from GIS data base and interagency habitat capability models.

Table 3-78 displays the impacts of harvesting all areas in the Project Area TLMP has defined as suitable-available for timber harvest, and assumes all harvested stands are in the closed canopy, second-growth condition. Note that this is a worst case scenario, and any areas not harvested will reduce the severity of the impacts to wildlife.

Table 3-78

Total Cumulative Changes in Habitat Capability, 1954-2004, including Total Cumulative Impacts to the Year 2140

Species	Habitat Capability 1954	Habitat Capability 1993	Habitat Capability 2004	Percent Reduction From 1954	Habitat Capability 2140*	Percent Reduction From 1954
Sitka black-tailed deer	14,942	10,245	9,483	36	5,937	67
Black bear	552	517	512	7	239	57
Marten	671	499	450	33	298	56
River otter	192	168	168	12	148	23
Hairy woodpecker	7,725	3,395	2,875	63	962	88
Brown creeper	17,725	5,594	4,839	73	1,433	92
Vancouver Canada goose	902	667	597	34	352	65
Bald eagle	518	375	373	28	342	34
Gray wolf	33	25	23	30	21	36

Based on Alt.F5, because Alt.F5 is the Preferred Alternative and the volume of 267 MMBF comes close to projected 356 MMBF volume for next CPOW entry. Change from 1954 assumes all previous harvest was vol. class 6 and 7 (worst case).

*Assumes harvest of all suitable-available forest lands identified by the TLMP Draft Revision, Alt. P (1991a) within the Project Area.

SOURCE: Matson 1992. Data derived from GIS data base and interagency habitat capability models.

Deer Population Objectives

The Alaska Department of Fish and Game (ADF&G) has established deer population objectives for all WAA's in Southeast Alaska. The population objectives for the individual WAA's can be found in "Population Objectives–Strategic Plan for Management of Deer in Southeastern Alaska 1991-95" (ADF&G 1991).

Deer population objectives for the WAA's range from maintaining deer habitat at 100 percent of the 1954 level to 75 percent of the 1954 level or maintaining the habitat capability at current levels. For many of the WAA's within the CPOW Project Area, the ADF&G Deer Population Objectives have been set at the current habitat capability; these include WAA's 1315, 1319, 1420, 1422, and 1530. Any timber harvest activity within these WAA's will reduce the habitat capability below that recommended by ADF&G. A comparison of ADF&G Deer Population Objectives and deer habitat capability in the Project Area WAA's is displayed in the Subsistence Section. A complete analysis of how projected timber harvest levels affect deer habitat capability on a Forest-wide basis as compared to the ADF&G population objectives can be found in the TLMP Draft Revision (1991a).

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KARST AND CAVE RESOURCES

Key Terms

Cave – any naturally occurring void, cavity, recess, or system of interconnected passages which occurs beneath the surface of the earth or within a cliff or ledge and which is large enough to permit an individual to enter
Doline or sinkhole – relatively shallow, bowl- or funnel-shaped depressions ranging in diameter from a few to more than 3,000 feet
Cave Resources – any material or substance occurring in caves on Federal lands, such as animal life, plant life, paleontological resources, cultural resources, sediments, minerals, speleogens, and speleothems
Epikarst – the upper surface of the karst. It is in this upper percolation zone that surface waters enter the karst hydrologic system. It is within this zone where most dissolution of the carbonate takes place
Karst – a type of topography that develops in areas underlain by soluble rocks, primarily limestones. Dolines, collapsed channels, vertical shafts, and caves are formed when the subsurface layer dissolves. Areas on which karst has developed is said to display "karst topography."
Karst Landscape – an ecological unit found atop carbonate bedrock on which karst has developed. A few of the characteristics of this ecosystem include: older, well-developed spruce and hemlock forests; increased productivity for plant and animal communities; extremely productive aquatic communities; well-developed subsurface drainage; and underlying unique cave habitats. (The term "landscape" is used here to describe a definable ecological unit and is not a geomorphological term.)
Refugium (refugia) – an area that has not been exposed to great changes undergone by the region as a whole (such as glaciation), and as a result provided conditions suitable for the survival of certain species
Speleothem – any natural mineral formation or deposit occurring in a cave or lava tube, including but not limited to any stalactite, stalagmite, helictite, cave flower, flowstone, concretion, drapery, rimstone, or formation of clay or mud
Speleogen – relief features on the walls, ceiling, and floor of any cave or lava tube which are part of the surrounding bedrock
Grike – solution-widened joints, faults, and/or bedding contacts in a karst area
Runnels – solution channels carved by water into bedrock, either on flat or inclined surfaces
Phreatic – the water-saturated zone beneath a water table. Phreatic caves are formed when the bedrock beneath the water table dissolves under pressure flow conditions. Phreatic caves generally have a sub-circular cross-section.
Vadose – the unsaturated zone above the water table. Vadose caves are formed when bedrock dissolves and erodes under free flow conditions, such as by streams. This results in the entrenchment of that stream and a cave passage resembling a canyon or narrow slot.

Affected Environment

Introduction

A cave is legally defined under federal law as: "... any naturally occurring void, cavity, recess, or system of interconnected passages which occurs beneath the surface of the earth or within a cliff or ledge and which is large enough to permit an individual to enter, whether or not the entrance is naturally formed or man-made. Such term shall include any natural pit, sinkhole, or other feature which is an extension of the surface" (Federal Cave Resource Protection Act, 1988).

Speleologists or cave explorers use "cave" to refer to all parts, regardless of size, of an underground system that links openings and chambers and that may connect the system to the surface. The most common type of cave is formed in limestone by dissolution. The term *cave* includes tree molds and lava tubes associated with lava flows, erosional caves, and those formed by dissolution of bedrock.

The Federal Cave Resources Protection Act (FCRPA) was passed in 1988 to secure, protect, and preserve significant caves on Federal lands for the perpetual use, enjoyment, and benefit of all people. Within the Tongass National Forest, caves generally occur in areas of karst topography which has formed primarily atop limestones and marbles. Exceptions to this are littoral caves ('sea' caves formed by wave action), boulder or talus caves, and lava tubes.

Inventory of karst topography to identify caves and cave resources is the first step to understand what "significant" resource values exist. Caves and cave resources are classified as "significant" if during survey the authorized officer determines that the cave has biological, cultural, mineralogical, paleontologic, geologic, hydrologic, or other resources that have important values for scientific, educational, or recreational purposes. Caves with unusual or unique features, associations, or recognition are also considered significant.

Although the FCRPA charges the Forest Service with protection only of significant caves, the Tongass National Forest is working to protect all important karst resources. Until resource values are determined, the Ketchikan Area is considering all caves to be significant. Caves and associated features and resources are an integral part of the karst landscape. One cannot ensure protection of the cave resources without managing the karst as an ecological unit.

To this point, much of the lower elevation karst areas have been harvested. These karst areas are well drained, and the nutrient rich soil supports highly productive stands of timber. The rugged surface of the epikarst provides the roots of the timber a surface on to which they can hold fast. Wind throw is less in these areas, allowing for increased age and growth of the timber. Only recently has protection of the cave resources on the Area become a major concern. Currently, when significant karst resources are discovered, mitigation measures are applied to ensure protection of the feature. This mitigation is based on observations of the effect of timber harvest on karst features within old harvest units and on the Area's current understanding of the of the karst landscape's sharacteristics. Mitigation measures for this project are discussed in Chapter 2.

Geologic Setting

The geology of Southeast Alaska is very complex. (See the Geology and Minerals section of this chapter for detailed discussion.) The bedrock includes lithologies

which range in age from Proterozoic-Cambrian to Quaternary (Berg 1988, Brew 1984, Eberlein 1983, Gehrels 1991). Portions of five tectonostratigraphic terranes are found in the Area (Berg et. al. 1988). Karst development is limited mainly to outcrops of uppermost Lower to Upper Silurian aged Heceta Limestone and the Middle to Upper Devonian Wadleligh Limestone. Locally these have been metamorphosed to marble.

It has been estimated that some 950 square miles of carbonate rocks underlie the Ketchikan Area of the Tongass National Forest. All but 25 square miles of carbonate are found on Prince of Wales Island and the surrounding islands. Two thin bands of Permian marble are exposed on Revillagigedo Island (Berg et. al. 1987). On Heceta Island, the Heceta Limestone has a maximum stratigraphic thickness of 9,900 feet but the total thickness of the formation probably exceeds 12,000 feet. The limestones are massive or thick-bedded, fine grained, locally fossiliferous, commonly fractured, and light- to medium-dark gray (Berg 1988, Brew 1984, Eberlein 1983, Gehrels 1991). Structurally the area is dominated by large, northwest-southeast trending, high-angle faults, many of which are deeply eroded and very visible from the air. These faults break the area into blocks of carbonate and non-carbonate bedrock.

Figure 3-26 illustrates known occurrences of carbonates on the Ketchikan Area. Figure 3-27 shows in more detail karst occurrence on the CPOW Project Area.

Figure 3-26
Known Occurrences of Carbonates on the Ketchikan Area

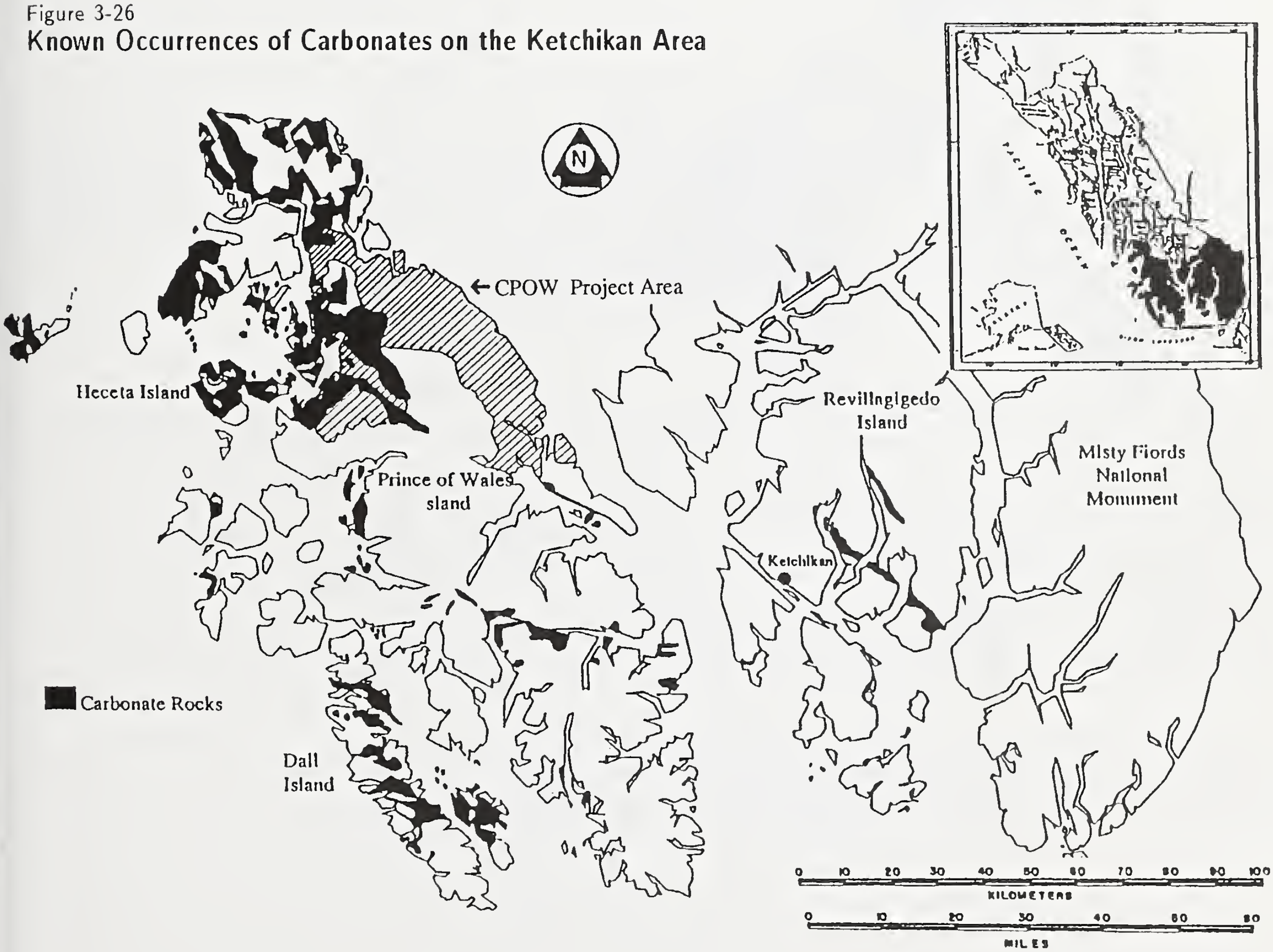


Figure 3-27
Karst Occurrence Within the CPOW Project Area

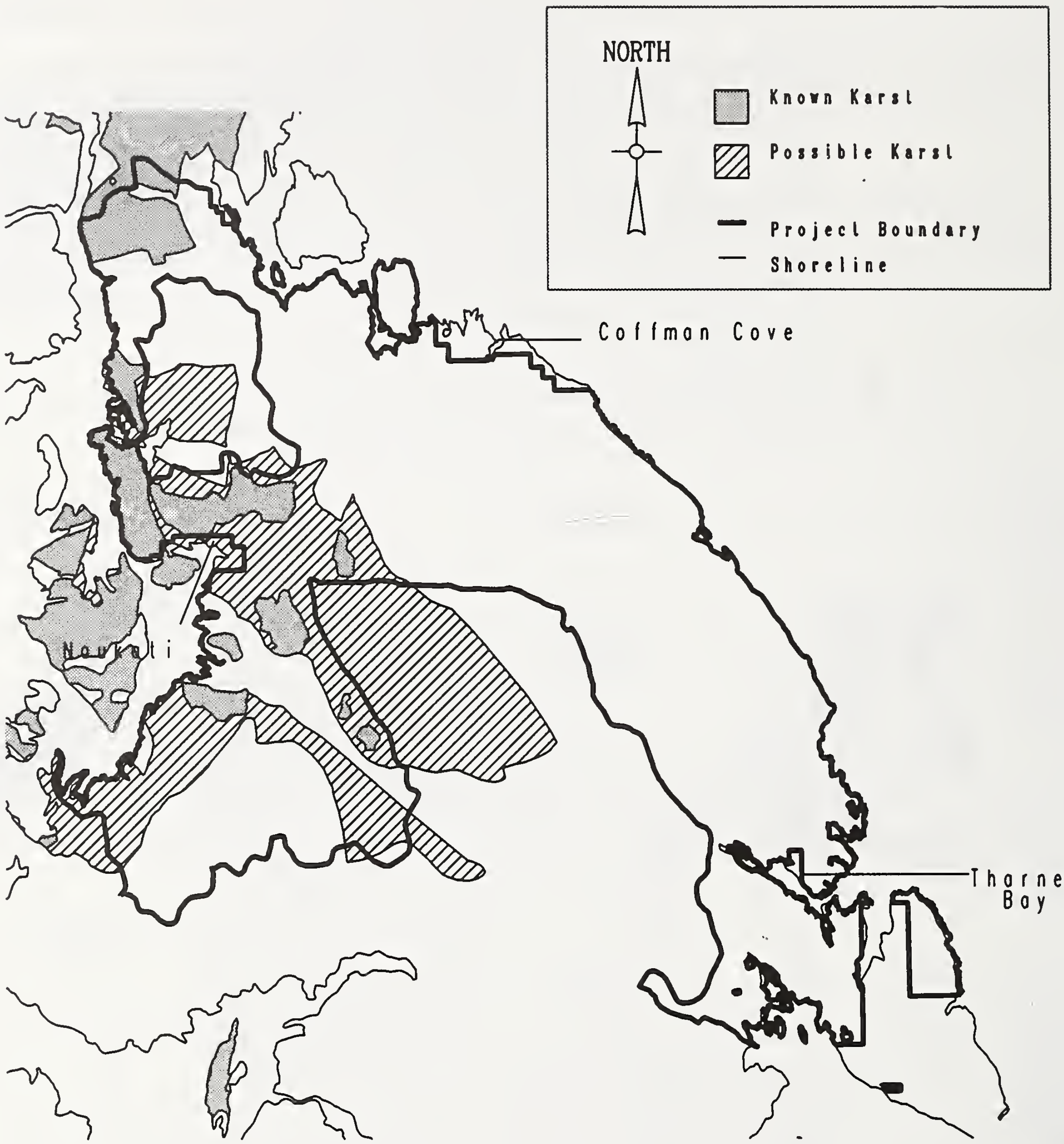
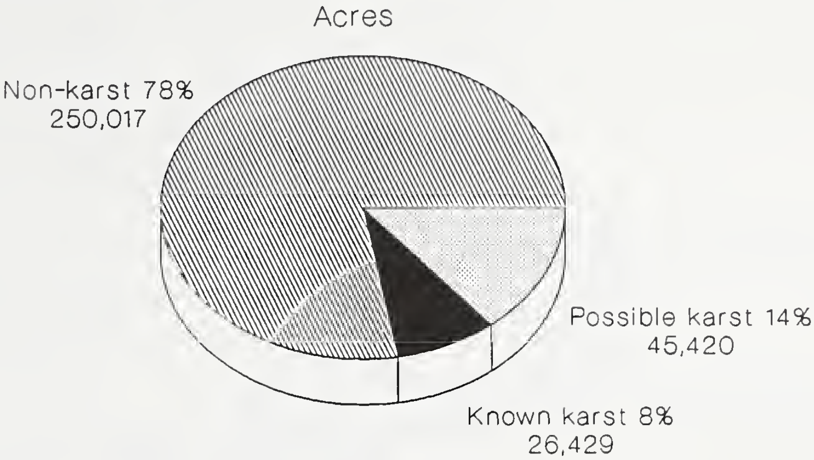


Figure 3-28 shows the occurrence of karst development within the CPOW Project Area VCU's.

Figure 3-28
Occurrence of Karst Development Within the Project Area's VCU's



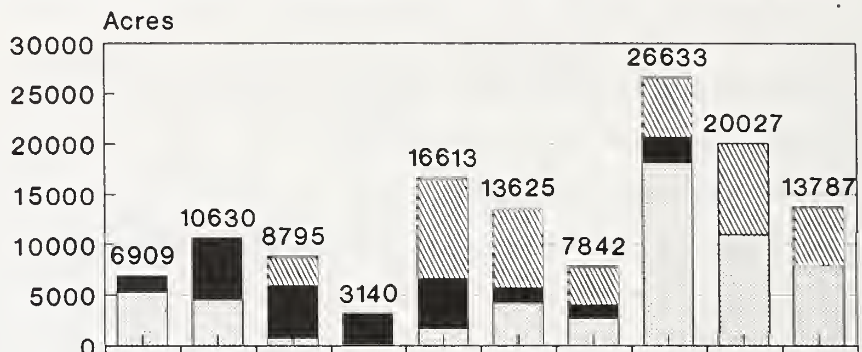
Known Cave Resources on the Project Area

Until recently only a few local residents knew about some of the caves and significant karst features. With the passing of the FCRPA, the Ketchikan Area entered into a partnership with the Glacier Grotto, the local National Speleological Society (NSS) grotto, to help evaluate the cave resources. In 1990 the Area began a widespread inventory process to gain a better understanding of the extent and significance of the karst resources. Emphasis is placed on identifying cave resources within proposed timber sale units where surface management activities could result in damage of karst resources.

In the previous four years of cave inventory and exploration (1987-1990), some 57 caves had been inventoried (Metzler and Allred 1990); during the 1991 field season, some 96 new caves were discovered. Many of these were located within or adjacent to proposed timber harvest units. As of August 1992, more than 255 caves have been inventoried, approximately 50 of which lie within the CPOW Project Area. (Specific locational information on the 50 inventoried caves in the CPOW Project Area is protected to prevent any degradation of these non-renewable resources.) Many other caves have been reported by the public, most of which are within past timber harvest units. Hundreds, if not thousands of yet unexplored caves exist within the boundaries of the Ketchikan Area of the Tongass National Forest.

For inventory purposes, the Project Area has been divided into non-karst areas, possible karst areas, and known karst areas. Approximately 22 percent of the CPOW Project Area is underlain by geology on which karst topography may have developed (See Figures 3-28 and 3-29).

Figure 3-29
Overall Occurrence of Karst Development Within the CPOW Project Area



	549.2	550	554.2	557	571	577	587.1	588	589	590
Possible karst	0	0	2861	0	9950	7862	3795	5973	9030	5884
Known karst	1584	6062	5173	3140	4989	1538	1327	2538	0	0
Non-karst	5325	4568	761	0	1674	4225	2720	18122	10997	7903

VCU

Non-karst Known karst Possible karst

To inventory proposed CPOW harvest units for the presence of cave/karst resources, a nonpersonal services contract was awarded to the Karst Research Group. This contract was administered by the Thorne Bay Ranger District to locate and map karst features, as well as local geology on probable karst areas within the CPOW Project Area.

A total of 167 units were inventoried, of which 35 contained cave of karst features. Of the 35 units containing cave or karst features, 24 had recommendations for mitigation and/or dropping the unit. The recommended surface management mitigation measures to ensure protection of the cave resources were in accord with the mitigation discussed in Chapter 2.

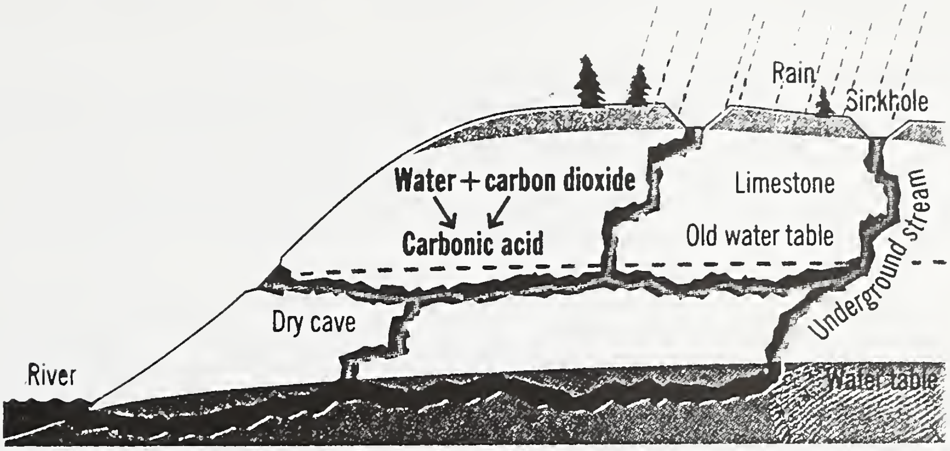
Several other units were discovered to contain karst where none was thought to exist. Appropriate measures to protect the cave resources in these units have been taken.

Factors Influencing Karst Formation

An understanding of cave development is essential to the hydrologic or geomorphic interpretation of any karst landscape. Karst and cave formation rates are a function of many factors. Significant karst is found from sea level to the top of the highest limestone peaks, 3,400 feet in elevation. The characteristics of the karst basically divide it into somewhat distinct types: low-level karst, which generally occurs below 1,100 feet elevation; and the sub-alpine and alpine karst, which are found above 1,800 feet. The following generalizations can be made about the physical nature of the karst:

1. Karst development in Southeastern Alaska is controlled by purity of the carbonate bedrock, the structural component of the bedrock (i.e., the bedding, faulting, folding, etc.), occurrence of intrusions, proximity of the carbonates to peatlands, the presence of a glacial mantle, precipitation, and temperature. Other factors influence karst development, but these are the main ones. The best karst rocks are >70 percent calcium carbonate ($CaCO_3$). Karst development can begin with

normal, slightly acidic precipitation at the 60 percent CaCO3 level. Full karst and cave development requires that the bedrock be 90 percent calcium carbonate or greater. The U.S. Bureau of Mines in OFR 81-92, *"Mineral Investigations in the Ketchikan Mining District, Alaska, 1991: Prince of Wales Island and Vicinity,"* list, the chemical analysis of 67 limestone and marble samples collected from the northern half of Prince of Wales and surrounding Islands. The percentage of calcium carbonate (CaCO3) in the samples varied from 91.47-99.46 with an average of 97.65 percent CaCO3. The combination of extremely pure carbonate bedrock, high precipitation levels, moderate temperatures, and very acidic waters from the peatlands has resulted in formation of the extensive karst on the Area.



Acid water flowing from muskegs dissolves limestone rocks, forming caves. The acidic water flowing through caves is then buffered to a neutral or slightly basic pH . SOURCE: TIME, Nov. 30, 1992

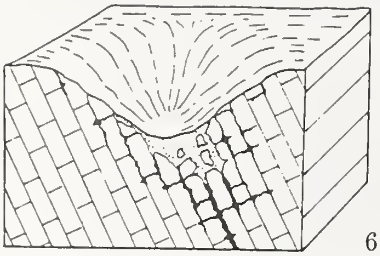
2. Peatlands form atop poorly drained non-carbonate rocks and glacial hardpans that lie atop carbonates. Surface waters originating from these poorly drained areas seldom flow more than a few yards onto carbonate substrate before diving below the ground, down vertical shafts or into cave entrances. The highly acidic waters from the peatlands accelerate cave and karst development. It has been found that pH levels within these *Sphagnum*-dominated wetlands can be as low as 3.0. The pH of these systems vary greatly with precipitation and *Sphagnum* species; however, these wetlands are invariably acidic with an average mean pH of about 4.8 (McQueen, 1990). Waters flowing from these wetlands have been measured to have a pH of 3.5-5.0. Waters exiting the cave systems have shown pH in a range from 7.5-9.0 The buffering capabilities of the pure carbonates is evident.

3. The cave passages that occur within the low-level karst are characterized by one or more phreatic tubes atop a vadose canyon. The canyons generally widen towards the floor of the cave. Commonly the caves have a vertical entrance down a shaft greater than 30' deep. Evidence suggests that the caves predate the last glacial period. The caves are emerging from the glacial sediments that filled much of the systems. Bones greater than 30,000 years old have been recovered from within cave deposits.

4. The carbonate bedrock beneath the forest floor has been sculptured by the high rainfall and the organic acids of the forest floor. Roots following soil-filled fractures and structural features have guided surface waters downward. This karst surface is characterized by highly dissected, smoothed bedrock with many small pits, arches, and passages. Grikes are common in these areas.

5. Annual rainfall exceeds 180 inches per year in some of the areas where karst has developed. Evidence of the force of the tremendous volume of groundwater

responsible for formation of the passages is everywhere in the cave passages. Scalloped walls, spiraling passages, ceiling pendants, deep plunge pools, frequent and dramatic water level fluctuations, flooded passages, and sumps are common. Such pressure tubes or conduits play an important role in cave development. With large seasonal storms and frequent rain-on-snow events large volumes of water are forced through these passages. Boulders larger than two feet in diameter seasonally batter the walls of some passages. Walls, ceilings, and older rocks on the floor bear collision marks from battering during high flow periods.



Solution doline

6. Groundwater temperatures range from 36 to 40 degrees F. in most caves. Air temperature fluctuates around 40 degrees F. With few exceptions, caves in the Area are wet.

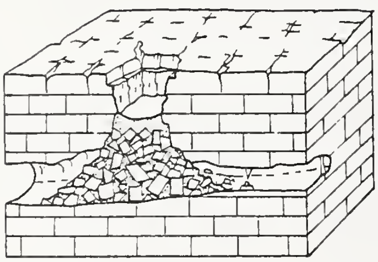
7. Above 1,800 feet elevation, sub-alpine and alpine karst is well developed; thousands of solution features per square mile may be present. These features form generally along structural weaknesses, sills, and dikes in the bedrock. Collapse and solution dolines are common where low gradient slopes are found at the higher elevations. Where massive carbonates are exposed, lines of pits and vertical shafts, and deep grikes form along structural features.

Between 1,800 and 2,400 feet elevation, the slopes support stunted alpine vegetation. Above 2,400 feet, little or no vegetation is found. Karst formation is driven by the high amounts of precipitation in these areas. The most recent glaciation has modified existing karst features leaving a thin mantle of glacial deposits in solution dolines, choking some features with glacial sediments. Frost wedging within some of the shafts and pits have choked the features with recent rockfall.

Surface Features and Cave Systems

Karsted surfaces found within the Ketchikan Area display many kinds of features. Only the low-level karst (below 1,100 feet) is found within the CPOW Project Area, so it is the only type of karst described below:

Low-level karsts are characterized by large closed depressions, uvala, solution channels, collapse and solution dolines, doline fields, vertical shafts, solution runnels, grikes, and caves. All these features are surrounded and/or at least partially covered by dense vegetation. Cockpit/cone karst (Jennings 1987) have been described from the northwestern corner of Prince of Wales Island (Allred 1989b).



Collapse doline

Many caves sump or choke within the first 100 feet. Vertical shafts, 30–80 feet deep, are commonly found adjacent to peatlands or rock formation boundaries. The majority of these are choked with glacial sediments and forest debris. One deep vertical shaft along the northern boundary of the Project Area, Bears Plunge, has been mapped to a depth of 147 feet and is over 30 feet in diameter. Several caves have been mapped to a length of greater than 3,000 feet, and El Capitan Cave (outside the Project Area), the longest cave discovered so far in Alaska, has over 10,800 feet of surveyed passages and a total depth of 256.3 feet (Allred 1991).

Dolines, or sink holes, are the most common karst feature encountered, often occurring in large numbers close together forming doline fields. Dolines over 200' in diameter and 100' in depth have been found. A typical cave within the low-level karst has an entrance at the base of a 30-80 foot deep vertical shaft or

collapse doline. These caves are characterized by a vadose canyon which meanders along structural weaknesses in the limestone or marble.

"Significance" of Karst Features and Caves

It is instructive to discuss the meaning of the term 'significant' as it applies to karst features and caves. It is important to understand there is a difference between a *"significant karst feature"* and a *"significant cave"*. In practice, however, the Ketchikan Area protects both equally. Current regulations which give cave/karst managment direction include: the Federal Cave Resources Protection Act (FCRPA) of 1988, FSM 2356, and the Ketchikan Area Standards and Guidelines for Cave Resource Managment. Draft cave managment regulations have been published under 36 CFR Part 261 and 290.

A *"significant cave"* as defined by the FCRPA means a cave located on Federal Lands that has been evaluated by the authorized officer and determined to have biotic, cultural, mineralogical, paleontologic, geologic, hydrologic, and/or other resources that have important values for scientific, educational, or recreational purposes. Because of the limited resource information that currently has been obtained, and the early stages of our understanding of these resources, the Area consideres all caves significant until proven otherwise.

A *"significant karst feature"* as defined in the Cave Resource Management Standards and Guidelines, is any feature within a karst landscape which has a direct atmospheric and/or hydrologic connection to the surface. These may be streamsink, collapse, and solution dolines, solution channels, or vertical shafts. These are primary stream insurgence and resurgence points, and cave entrances. It is not necessary to have visible surface-water flows to have direct hydrologic connection to the surface. The size and density of the karst features are also considered. It is important to recognize that caves and associated features and resources are an integral part of the karst landscape. Karst must be managed as an ecological unit to ensure protection of the cave resources.

The Karst Landscape

The karst landscape is an ecological unit found atop carbonate bedrock on which karst has developed. A few of the characteristics of this ecological unit include: older, well-developed spruce and hemlock forests, increased productivity for plant and animal communities, extremely productive aquatic communities, well-developed subsurface drainage, and the underlying unique cave resources. The interaction of the variables controlling the karst landscape are not fully understood at the present time. Extensive research is needed to fully understand and describe the characteristics of this ecosystem. The karst landscape is an excellent example of how geology can control species distribution and abundance. The following description of the karst landscape discusses its major components including: geology, hydrology, mineralogy, biology (vegetation, wildlife, and fish), cultural, and recreation.

Geology

As one travels from the northern boundary of the Project Area southward, changes in the geology and geomorphology affect karst development. The limestone and marble found within VCU's 550 and 549.2 reflect a $CaCO_3$ purity >90 percent (estimated). Where carbonate rocks are found within these VCU's karst is extremely well developed. There is a high density of solution features such as grikes, solution channels, and dolines or sinkholes.

South of these VCU's, the carbonates are noticeably less pure. Exceptions to this are some elevated carbonate terrain within VCU's 557 and 588 where karst is very well developed. This most likely reflects facies changes in the Heceta Limestone as one progresses south and east across the Project Area. Generally, in the central and southern part of the Project Area, surface karst features such as grikes are less frequent and solution channels and dolines are clogged with clays and silts. Solution channels tend to follow local slope gradients rather than structural trends. A thicker mantle of glacial deposits covered the carbonates, and the water sources were not concentrated enough to develop openings large enough to enter, possibly due to the flatter topography.

One small outcrop of steeply-dipping, bluish-gray and white marble was discovered above in VCU 581 above and south of Luck Lake. Karst was very well developed within the block which contained many small caves and sinking and emerging streams. This area contained high volume timber and was planned for harvest under the 1989-94 LTS EIS. The Regional Forester decided to not release this timber in order to comply with TTRA proportionality requirements.

The purity of the carbonates has a direct effect on soil development due to carbonate weathering, development of extensive subsurface drainage through solution cavities and underground channels, and the buffering effects of the carbonates on the acidic waters originating from non-carbonate substrate and peatlands. Therefore, the geology controls the productivity of the animal, plant, and aquatic communities as well as the development karst.

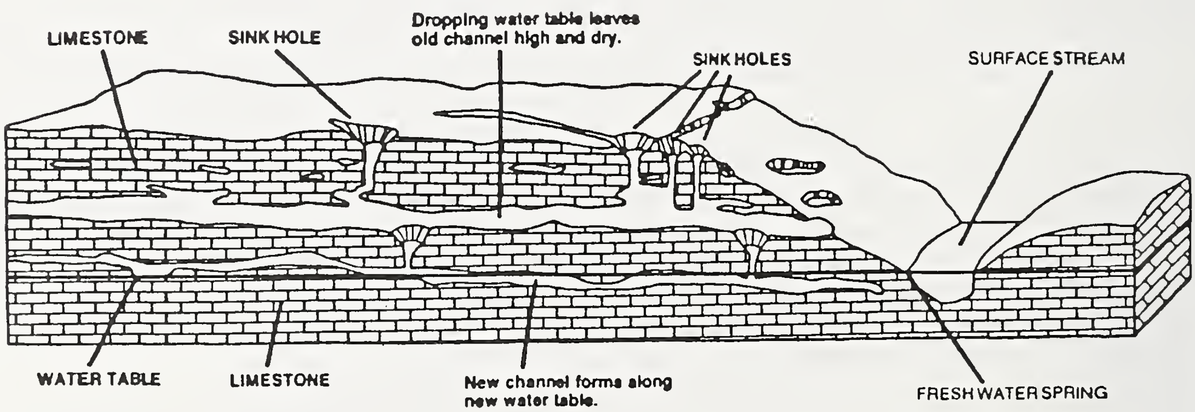
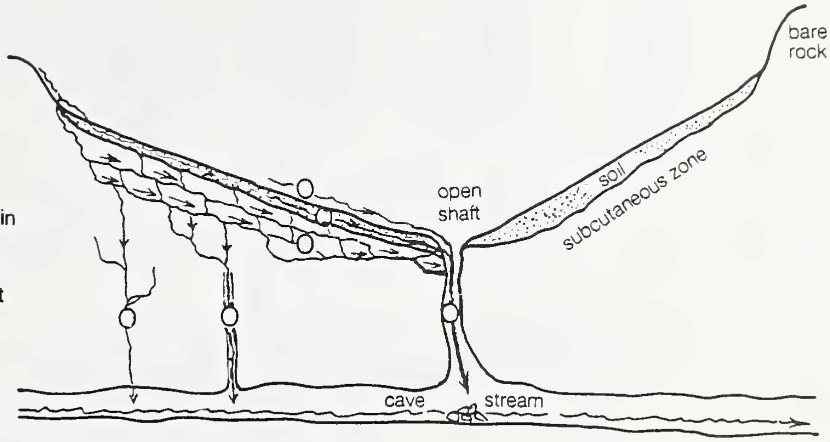


Diagram of a karst terrain.

Karst Hydrology

Karst and cave development is a story of water's interaction on a soluble rock terrain. Karst landforms result from processes operating in coupled hydrological and geochemical systems. Karst landforms cannot evolve until subterranean connections have been established from input to output boundaries. Therefore, the well developed karst features within certain portions of the Project Area suggest that these subterranean connections exist. The geochemistry, nutrient cycling and capacity, sediment transport capabilities, and flow characteristics of the hydrologic system all contribute to karst and cave development. These parameters control passage formation rates, nutrient supply to the cave life, and the productivity of the system as a whole. All these parameters make up the karst's hydrology.

Water enters and circulates in cave systems in complex ways. Minor changes in the hydrologic system can affect the biological component of caves, as well as cave development itself.



Mineralogy

This relates specifically to the wide variety of speleothems found within the cave passages. No specific inventory of these features has been initiated. It is known that many unique speleothem forms have been described from the caves of the area, mineral forms possibly found no where else in the world. Besides the presence of many unique, more common speleothems such a helectites, soda straws, and varieties of cave coral, moonmilk speleothems and deep brown flowstones are present in many systems.

Moonmilk is a term that applies to white, amorphous masses of crystals that are pasty or plastic when wet, powdery when dry. It has been found that in other cave systems in the world that it is exceptional for moonmilk to achieve a thickness of over a foot. It is common in the cave passages on the Ketchikan Area to find moonmilk accumulations greater than two feet in thickness. Underwater forms of moonmilk have been described, possibly the first described from anywhere. It has been suggested that moonmilk is of bacterial origin, where the organisms break down ordinary calcite crystals and re-deposit them as micro-fibers (Ford and Williams 1989).

Deep brown flowstones (or "hot fudge sundae" as the cavers refer to them) are found in many of the cave passages. Preliminary analysis of these features suggest that the "sundae" is a community of organisms existing within humic substances held together with a biological "glue". Mycologists found that these flow features contain protozoans, hyphal forming fungi, bacteria, and "who knows what else."

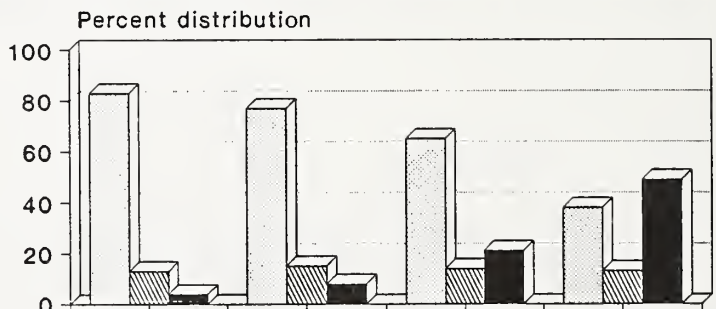
Karst Biology

Only limited information is available on the importance of the karst landscape to the plant and animal life. A few of the characteristics of this landscape include: older, well-developed spruce and hemlock forests; increased productivity for plant and animal communities; extremely productive aquatic communities; well developed subsurface drainage; and the underlying unique cave habitats.

Vegetation/Forest. There is a definite tie between the karst and the productivity of the spruce and hemlock forests found there. As previously mentioned, the major contributors are believed to be the nutrient rich soils, well developed subsurface drainage, and dissected bedrock surface which allows the tree roots to hold fast and become exceptionally windfirm. The old growth on the karst provides a well structured, multi-layered canopy resulting in important winter range habitat. The structure of the forest provides many forbs and shrubs for wildlife. It is possible that the available forage contains, at a minimum, higher calcium levels allowing for better bone, muscle, and antler development. The combination of quality forest structure and abundant nutritional browse could make the karst landscape exceedingly crucial habitat.

One way of demonstrating the productivity of the karst areas is to compare timber volume classes of the karst to non-karst areas. Figure 3-30 shows the volume class distribution of units identified in the CPOW MELP which are classified as non-karst, possible karst, or known karst.

Figure 3-30
Volume Class Distribution of Non-Karst, Possible Karst, and Known Karst



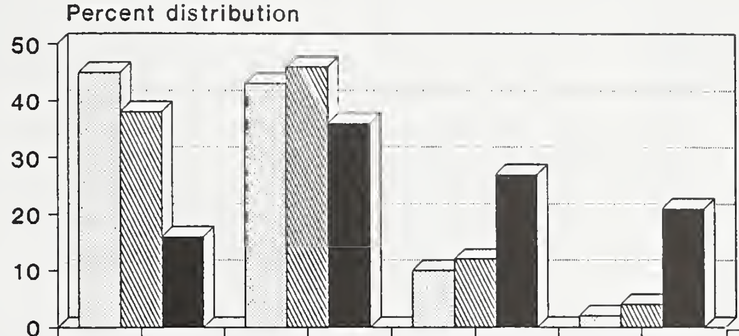
	VC-4	VC-5	VC-6	VC-7
Non-karst	83	77	65	38
Possible karst	13	15	14	13
Known karst	4	8	21	49
Total	100	100	100	100

Non-karst Possible karst Known karst

SOURCE: Shoaf 1993

Figure 3-31 shows how much of each volume class is contained on non-karst, possible karst, and known karst areas within CPOW MELP units.

Figure 3-31
Distribution of Volume Class Occurrence on Non-Karst, Possible Karst, and Known Karst

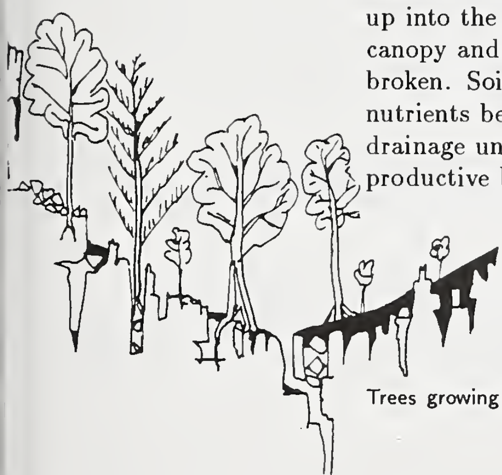


	VC-4	VC-5	VC-6	VC-7	Total
Non-karst	45	43	10	2	100
Possible karst	38	46	12	4	100
Known karst	16	36	27	21	100

SOURCE: Shoaf 1993

Figure 3-31 shows that 48 percent of the acres of known karst supports VC 6 & 7 timber while only 12 percent of the acres of Non-karst supports VC 6 & 7 timber. Figure 3-30 shows that 49 percent of the VC 7 timber within possible harvest units in the Project Area has been identified to be within known karst, and that known karst-supporting commercial forest land occupies only 7 percent of the acreage of the Project Area.

On karst landscapes worldwide, timber harvest has led to serious, often long-term declines in soil depth and fertility, culminating in some cases in permanent deforestation. Trees growing on karst generally have roots extending down into the dissolved cracks in the bedrock. These roots act to pump water and nutrients back up into the forest canopy. Much of the site productivity is tied up in the forest canopy and in this nutrient cycle. When trees are harvested this nutrient cycle is broken. Soils tend to be thin residual soils on these karst areas. Vertical migration of nutrients becomes possible in areas of heavy rainfall and well developed sub-surface drainage under these soils once the forest canopy is removed. These karst systems are productive but fragile.



Trees growing on karst generally have roots extending down into dissolved cracks in the bedrock.

Wildlife. Many wildlife species find the surface karst features and the stable environment and shelter provided within the caves to be valuable habitat. Caves have been used as natal den sites for otters, and as resting and denning sites for deer, bear, wolves, and small furbearers. Deer are known to rest around cave entrances both in summer, when the air coming from the caves is cooler, and in winter, when the cave entrance environment is warmer than elsewhere.

Cave systems provide critical roosting and hibernating habitat for bats. The stable environment within the caves provides roosting habitat both in summer and winter. Bats select cave sites because they fulfill very specific requirements, involving cave structure, air circulation patterns, temperature profiles, and location relative to feeding sites. Preliminary surveys show some bat usage of most of the caves inventoried. Bats can been found within a few caves once temperatures drop below freezing. Roost sites are beyond where freezing air temperatures penetrate from the cave entrance. Three species of bat have been reported from caves near the Project Area: *Myotis lucifugus*, *M. californicus*, and *Lasionycteris noctivaganus*.

Cave systems provide habitat for many invertebrate organisms. Preliminary studies conducted during July 1992 have identified some 77 species from collections made within several caves. Of these, 7 species show signs of cave adaptation, including loss of pigment, loss of eyes, or appendage adaptation. Taxonomic identification of these species must be done before further biological correlations or associations can be made. One amphipod has been identified as *Crangonyx obliquus-richmondensis*, the first ever record of this amphipod's occurrence in a cave in all of western North America and Alaska. These collections represent a summer assemblage of organisms. Since many other organisms rely on the stable cave habitat to survive the winter, winter collections must also be made.

Some bird species—including dippers, thrushes, and swallows—have been known to use cave entrances for nesting and feeding. Rookeries for seabirds including cormorants and pigeon guillemots have been found in some littoral caves.

Fisheries. The karst landscape influences productivity of its aquatic habitats in several aspects. The geochemistry associated with karst development contributes to productivity in aquatic environments through its carbonate buffering capacity and carbon input dissolved from the limestone bedrock. This will have significant downstream effects on the aquatic food chain and biotic community. Preliminary studies suggest that the aquatic habitats associated with the karst landscape may be 8–10 times more productive than adjacent non-karst dominated aquatic habitats. The karst dominated aquatic habitats support a higher biodiversity than the non-carbonate based systems, have higher growth rates for smolts and resident fish, reflect less variable water temperatures and flow regimes, and contain unique habitat affecting species distributions, abundance, and adaptations. It is believed the karst waters have the following connection to fisheries:

1. The carbonates have important buffering effects. Very acidic waters flow from the peatlands (pH 4-5) into karst systems, emerging at a less acidic pH of 8-9.

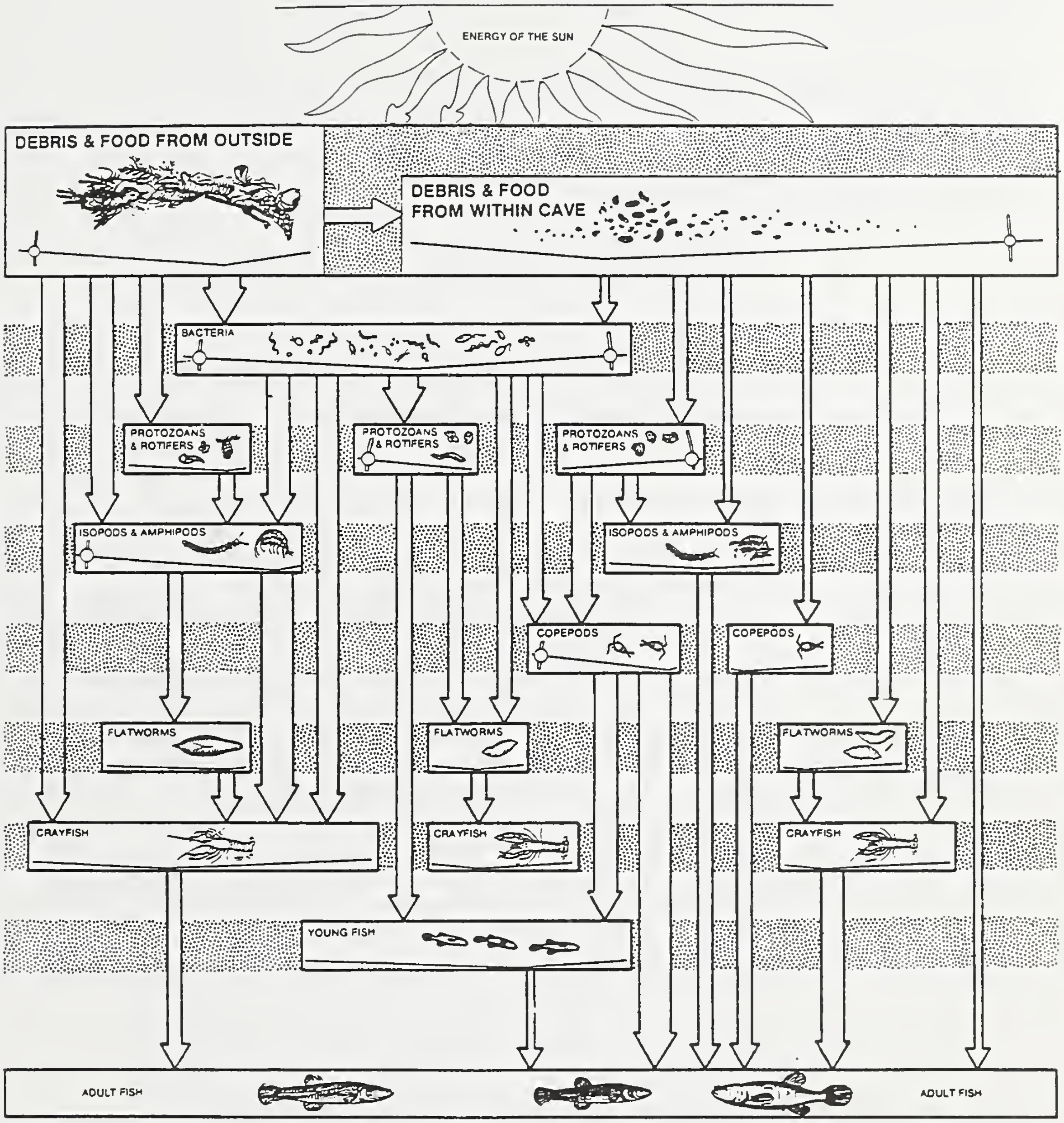
2. Resident time for groundwater in the karst systems results in cool, even temperature water. Flow rates through caves are somewhat consistent. The storage capability of the karst systems results in lower peak flow events and higher low flow periods. This helps to moderate the effects of storm events on resurgence streams.

3. The cave systems filter out debris and sediments, although they do not filter out chemical impurities or microorganisms.

4. Smolts and resident trout use the cave systems for protection from predation, for shade, and for a feeding area since many insects utilize the photic zone of the cave systems for breeding and shelter. Adult salmon have been seen spawning through some cave systems, and evidence of salmon spawning in the caves has been found.

5. Karst streams have a much greater and diverse aquatic insect population, both within the caves and in the streams.

CAVE FOOD WEB
PINBALL MACHINE



Cultural Significance and Paleontology

The potential cultural and paleontological significance of the caves and karst landscape is high. Recent work on Prince of Wales and surrounding islands on the extensive karst resources, combined with botanical surveys of alpine areas and genetic studies on chum salmon populations, strengthen the argument for a well developed coastal refugium along the western coast of southern Southeast Alaska. The evidence sheds new light on problems of glacial chronology, climatic change, biogeography, and archaeology along the western margin of North America.

"Refugium (Refugia): An area that has not been exposed to great changes undergone by the region as a whole (such as glaciation), and as a result provided conditions suitable for the survival of certain species."

Recently, four black bears, one of which dates to approximately 11,565 years before present (B.P.) and five grizzly, now extinct on Prince of Wales Island, one dating to approximately 12,295 years B.P., have been discovered. Natal otter dens dating to 5,700 B.P. have been described. Early Natives were exploring caves some 3,300 years ago. The remains of both fisher and marmot, now extinct on the islands have been recovered. The marmot was recovered from within the Project Area and dated to over 30,000 years B.P. From botanical studies on Dall and Prince of Wales islands, plant populations have been described which suggest ancestry from local remnant populations that escaped glaciation. Recent research concerned with chum salmon populations from the Queen Charlotte Islands and southeastern Alaska has shown that the greatest genetic variation exists in the fish along the western coastlines of Queen Charlotte and Prince of Wales islands. These significant genetic variations suggest longer habitation of streams in these areas, therefore the possibility of coastal refugia. This new information, combined with limited data on raised marine beaches in the area, strengthen the argument for a coastal refugium, in which Pleistocene mammals and humans may have migrated south.

It is quite likely that if the karst landscape is as productive for both plants and animals as preliminary observations suggest, that these areas were and are important subsistance areas for Native populations.

Recreation

The potential recreational use some of the caves and karst within the karst ecosystem is an important factor. Wise management of the caves requires an understanding of their resource values before management strategies can be developed. Once the cave systems are better understood and inventories are completed, a few select caves will have directed public access. Many of the caves will have restricted access due to extreme safety hazards, unique resources, or because of their pristine condition. The majority of the caves will remain undeveloped. A Cave Resource Management Strategy will be drafted to help the Area protect the caves and serve the public. Directed access caves will have individual management plans drafted. It has been shown that unrestricted use of caves can result in rapid degradation of fragile cave resources. Visitation can be controlled through a registration process, cave gating coupled to either registration or guided trips, and through control of location information. Other opportunities exist to develop trails through many of the heavily karsted areas past vertical shafts, sink holes, collapsed channels, etc. This would allow the public to experience and learn about the karst ecosystem first hand.

Effects of the Alternatives

Direct, Indirect, and Cumulative Effects

Introduction

The cave resources the Forest must protect are an integral part of the karst landscape, and karst landscapes are as complex as they are productive. Wise management of the karst landscape is essential to ensure protection of the cave and karst resources and the productivity of the system.

Protection of the unique cave and karst resources on the Ketchikan Area is a new and developing program. Areas directly adjacent to significant cave resources will have appropriate mitigation applied to ensure their protection. These areas include not only the cave entrance but also drainages and significant karst features that directly affect the cave's ecology. Monitoring of the prescribed mitigation is conducted throughout the year, with frequent visitations to the caves by the Forest geologist, District cave management specialists, and caving volunteers providing an overview of the effectiveness of the mitigation. The physical nature of the cave is documented prior to timber harvest. The known resource values of the caves are carefully reviewed to see if any changes occur. The effectiveness of proposed mitigation is reviewed to see if changes in prescriptions are needed or if more intense timber sale administration is required. Recently, a formal monitoring plan has been developed to characterize the possible effects of timber harvest on the karst landscape and to determine the effectiveness of applied mitigation.

Many of the landscape characteristics and possible cumulative effects of proposed surface management activities are not fully understood or known. What will be discussed here is based on field observations, local research, and from what is known about cave/karst systems elsewhere. The same components used to describe the karst landscape will be used to illustrate potential effects.

Types of Potential Impacts (Indirect Effects)

GEOLOGY: Indirect effects on cave and speleothem development. When the forest of the karst landscape is intact, the trees act as a buffer, allowing acidic surface water to flow into the karst systems at a slow enough rate that the acids can be neutralized. Timber harvest and disturbance of the forest floor removes the buffer, which may result in faster influx of larger volumes of water than the present karst systems can handle. This may also result in a changed geochemistry of the groundwater within the karst systems, altering cave formation rates and speleothem development.

KARST HYDROLOGY: Indirect effects on karst hydrologic systems. The Area has little information on the complexity of the karst hydrologic systems within the Project Area or the indirect impacts on these systems from timber harvest. Hydrologic models currently used for estimating the cumulative effects of proposed surface management activities are not designed to model the effects of timber harvest on the karst landscapes. Much more research is needed to adequately define the karst basins and the effects of timber harvest on the karst hydrology. However, im many

cases the project has deferred timber harvest on areas of karst development. In other cases, harvest units were redesigned or else employed mitigation measures to lessen the impacts on the underlying karst development. Because of these measures, the unavailable information does not preclude the evaluation of reasonably foreseeable significant impacts. Consequently, the unavailable information should not preclude the decision-maker's ability to make a reasoned choice among the alternatives.

It is known that timber harvest increases runoff thereby increasing sediment and debris transport capabilities and flooding passages which have not flooded for centuries. This can result in loss of atmospheric surface connection by the silting in of entrances. Silt will also coat chambers within the caves as they fill up from flood events.

Caves depend on the surface because food production is negligible within the caves. Nutrients enter the cave through ground and surface waters, and through migrating animals that feed outside and seek the cave for shelter and reproduction. If atmospheric connection to the surface is lost through sediment and debris accumulations, animals can no longer enter the system. If stream flows into a cave system increase resulting in floods, there is much food but organisms cannot persist. Adversely, limiting or changing surface flows away from these systems limits the available food and will alter speleothem and cave passage development. With minor changes in the karst hydrologic system the biologic component of the caves and cave development can be greatly affected.

It is estimated that over 50 percent of the significant karst features that have been found on unharvested land are connected to the surface via air or water, and most can be still physically entered. In existing harvest units, less than five percent of the significant karst features still have an atmospheric connection, because past surface management activities, conducted before the passage of FCRPA, have filled in many features with sediment, logging slash, and debris. Since 1988 these practices have been discontinued and these features are now being protected.

When logs are yarded through and across dolines, a furrow is plowed into these unstable and oversteepened slopes. In old harvest units approaching 20 years in age, these furrows have not revegetated; sediments have run down the slopes and into the karst systems. Many of the caves begin as narrow canyons, and woody debris and sediment from logging can fill in the cave entrance and lower portions of the doline.

Many dolines have been filled in for forest road construction. The dolines historically have been a convenient place to funnel excess surface waters off road ways. Oversized materials and overburden from road and quarry development have been piled in large dolines. Dolines adjacent to landings previously were used not only for slash disposal but also for garbage disposal. This practice was discontinued in 1988 and these dolines are now being protected.

MINERALOGY: Indirect effects on cave mineralogy. It is not known what effect timber harvest has on cave mineralogy. If timber production results in a change in the geochemistry of the karst's hydrologic system, speleothem development could be greatly affected. Observations in some caves suggest that passages now flood that did not flood in the past, resulting in fragile formations on the ceiling of the passages becomming tannin stained and showing signs of dissolution. In many cases the project has deferred timber harvest on areas of karst development. In other cases, harvest units were redesigned or else employed mitigation measures to lessen the impacts on the underlying mineralogy. Because of these measures, the unavailable information

does not preclude the evaluation of reasonably foreseeable significant impacts. Consequently, the unavailable information should not preclude the decision-maker's ability to make a reasoned choice among the alternatives.

KARST BIOLOGY: Indirect effects on karst biology. It is not known what effect timber harvest has on the productivity of the karst landscape and how that relates to the plant and animal life. However, in many cases the project has deferred timber harvest on areas of karst development. In other cses, harvest units were redesigned or else employed mitigation measures to lessen the impacts on karst biological features. Because of these measures, the unavailable information does not preclude the evaluation of reasonably foreseeable significant impacts. Consequently, the unavailable information should not preclude the decision-maker's ability to make a reasoned choice among the alternatives.

Vegetation. Field observations and aerial photo interpretations show strong evidence of greatly increased surface runoff on karst areas after harvest, which increases sediment, nutrient, and debris transport capability of these systems. Transport capability is increased both vertically and laterally. Current harvesting techniques leave the slash within the unit, which helps to protect the shallow fragile soils from some erosion and drying. The Area's timber regeneration information is from low elevation, flat topography karst areas, and there seem to be few regeneration problems in these areas. Soil tends to be deeper in these areas as well. Since most easily accessible, low-level karst areas within the Project Area have been harvested (see Figure 3-32), timber harvest is now moving into steeper, higher elevation karst areas which are characterized by shallower, better drained soils, such as McGilvery. Observations suggest that with harvest atop these soils, much of the soil may be removed if adequate log suspension is not achieved, and some may become excessively dry once the protective forest canopy is removed. Observations suggest that these steeper areas show reduced regeneration or remain as bare rock slopes in the units. It is quite possible that regeneration of these areas may not be as successful as the lower, flatter, karst areas.

Wildlife. If timber harvest alters the air circulation and associated temperatures adjacent to the cave entrances, the stable microclimate within the cave may be altered, resulting in loss of habitat. Significant surface disturbance adjacent to these systems may result in collapse of passage and/or, depending on the season and weather, disturbance of nesting of hibernating animals.

Fisheries. The increased productivity of the aquatic habitat of karst landscapes as demonstrated on karst areas in other regions is well understood, but no specific information on the effects of timber harvest on the productivity of the aquatic habitat within the karst landscapes of Southeastern Alaska has been gathered. Field observations suggest that flow regimes and sediment transport have been greatly altered by timber harvest. Areas now flood that did not do so in the past. How these changes relate to the productivity of aquatic habitat is unknown. Several research proposals designed to address these questions have been proposed and research into these questions will begin during the summer of 1993.

CULTURAL AND PALEONTOLOGICAL: Indirect effects on cultural and paleontological resources. These resources could be affected if timber harvest were to result in increased runoff, sedimentation, debris transport, or geochemical changes in the ground waters. Though limited cultural remains exist in the caves, there are few caves that do not contain at least some paleontological resources. These resources

could be eroded, buried, or chemically changed if timber harvest were to have the effects discussed above.

RECREATION: Public use. Timber harvest activities include the construction and reconstruction of roads, which may lead to an increase in public use of caves. Such increased access would provide recreational opportunities for public exploration and enjoyment of cave resources. However, increased public use may increase the risk of destruction of cave resources through inadvertent damage, heavy use, unethical caving practices, and ground disturbing activities.

Karst Research Group: Inventory Results and Recommendations

To inventory proposed harvest units for the presence of cave/karst resources, a nonpersonal services contract was awarded to the Karst Research Group (KRG). This contract was administered by the Thorne Bay Ranger District to locate and map karst features, as well as local geology on probable karst areas within the CPOW Project Area.

For inventory purposes, the Project Area was divided into non-karst areas, possible karst areas, and known karst areas. Approximately 22 percent of the CPOW Project Area is underlain by geology on which karst topography may have developed. (See Figures 3-22 and 3-29, earlier in this section.)

Proposed harvest units were initially examined to determine possible karst features. A primary survey was conducted using air photographs, existing geologic maps, and geology evident in outcrops and road side cuts, to help define which of the proposed harvest units were likely to contain karst or cave features. Those units identified as having probable karst features were looked at: a total of 167 units.

Of the total 167 units inventoried, 35 contained cave of karst features. Of the 35 units containing cave or karst features, 24 had recommendations for mitigation ranging from harvest as planned with mitigation measures to harvest after redesign of the unit from the timber base. Of the 24 units requiring mitigation, 6 were completely dropped, 6 units had substantial portions of the proposed unit deleted, and the remaining 12 received mitigation measures which included buffers, reconfiguring the unit, and requirements for helicopter logging so that no roads would be built that might damage cave/karst resources. Other mitigation measures included directionally falling timber away from karst features, requiring partial and full suspension, and re-routing roads to avoid karst features. Of the 18 units remaining, mitigation to protect the significant karst features, caves, and other resources resulted in deletion of 195 acres from the total area of the proposed units. This resulted in a pool of units on known karst totaling 696 acres for consideration under various alternatives.

Specific CPOW Potential Impacts

Before a specific discussion of the direct effects of the proposed alternatives, a description of current status of the karst landscape is needed. Figure 3-29, earlier in this section, shows the overall occurrence of karst development within the Project Area. Figure 3-32 shows three pie charts illustrating previous harvesting of commercial forest land (CFL) on non-karst, possible karst, and known karst. Figure 3-33 illustrates the extent to which the CFL lands on known karst have been harvested, on a VCU basis.

Figure 3-32
Previous harvest of CFL on Non-Karst, Possible Karst, and Known Karst within the CPOW Project Area, in Acres and Percent

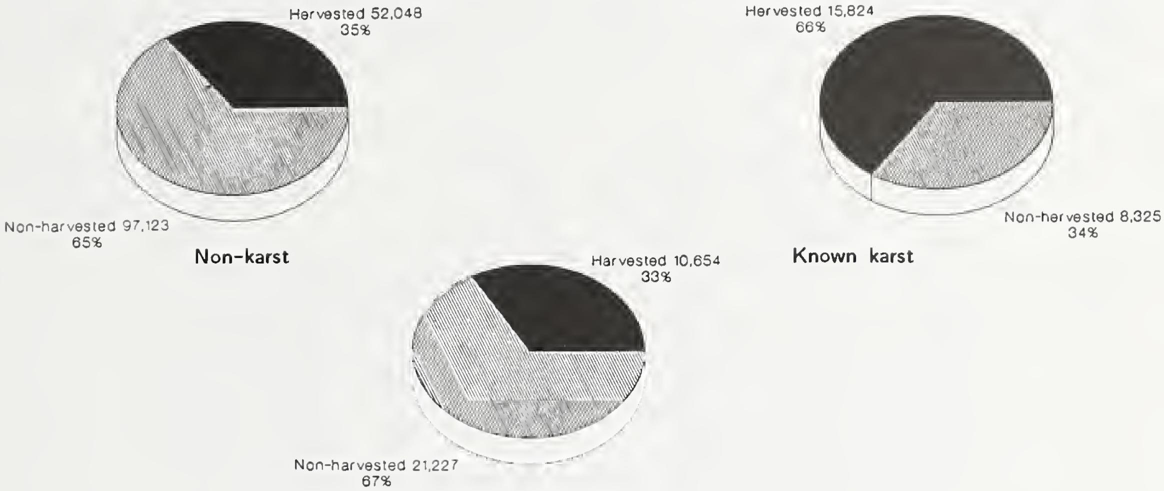
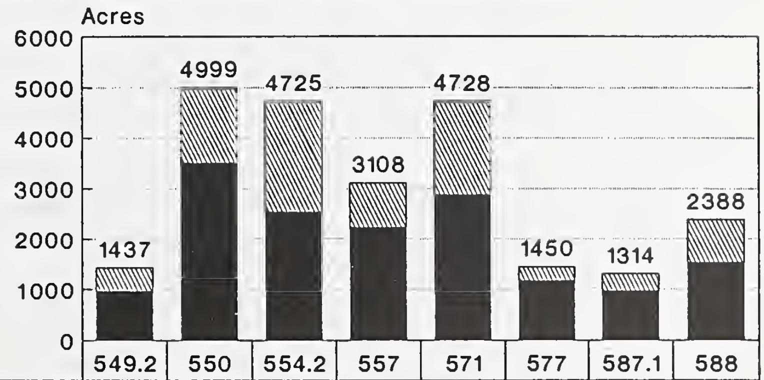


Figure 3-33
Extent of Harvest of CFL Lands on Known Karst



	549.2	550	554.2	557	571	577	587.1	588
Not harvested	462	1494	2179	868	1841	278	349	854
Harvested	975	3505	2546	2240	2887	1172	965	1534

VCU

Harvested   Not harvested

SOURCE: Shoaf 1993

These charts show that 33–35 percent of the CFL on non- and possible karst has been harvested, while 66 percent of the CFL on the known karst is in a harvested state. Some 24,149 acres of CFL on known karst exists in the Project Area, or approximately 7.5 percent of the Project Area. The 66 percent of the CFL that has been harvested from the known karst equals some 15,824 acres. Past harvest on the karst landscape has been disproportionately high compared to the other areas, most likely because of the higher percentage of Volume Class 7 timber. Table 3-79 summarizes the effects of

the alternatives on the acres of known karst falling within VCU's within the CPOW Project Area.

Table 3-79

Total Effects of Past Harvest on the Known Karst Landscape, by VCU, and Cumulative Effects of the CPOW Alternatives

VCU	Total VCU Acres	% of VCU That is Known Karst	% of Known Karst That is CFL	% of CFL on Known Karst That is Harvested	Percent Cumulative Effects of Harvest in 1996 of Known Karst By Alternative						
					1	1a	F2	F3	F4	F5	F6
549.2	6,909	23	91	68	68	68	68	69	69	69	69
550	10,630	57	83	70	70	70	73	75	74	71	70
554.2	8,795	59	91	54	54	54	54	55	55	55	54
557	3,140	100	99	72	72	72	74	74	74	74	72
571	16,613	30	72	61	61	61	64	64	64	64	61
577	13,625	11	94	81	81	81	83	83	83	83	81
587.1	7,842	17	99	73	73	73	73	73	73	73	73
588	26,633	10	94	64	64	64	67	67	71	71	64
Entire Proj.Area				66	66	66	67	68	68	68	66

SOURCE: Computer-generated information from Inventory Database, 6/4/93.

Alternatives 1 and 1a. Alternatives 1 and 1a, the no-action alternatives, would result in no further effects on the karst/cave resources.

Alternative F2. Alternative F2 would result in an additional 400 acres of harvest on the known karst within the Project Area. The total cumulative effects would result in 67% of the known karst landscape within the Project Area to be in a harvested state.

Alternative F3. Alternative F3 would result in an additional 585 acres of harvest on the known karst within the Project Area. The total cumulative effects would result in 68% of the known karst landscape within the Project Area to be in a harvested state.

Alternative F4. Alternative F4 would result in an additional 615 acres of harvest on the known karst within the Project Area. The total cumulative effects would result in 68% of the known karst landscape within the Project Area to be in a harvested state.

Alternative F5. Alternative F5 would result in an additional 508 acres of harvest on the known karst within the Project Area. The total cumulative effects would result in 68% of the known karst landscape within the Project Area to be in a harvested state.

Alternative F6. Alternative F6 would result in an additional 20 acres of harvest on the known karst within the Project Area. The total cumulative effects would result in 66% of the known karst landscape within the Project Area to be in a harvested state, effectively no significant change.

VISUAL RESOURCES

Key Terms

Background - the distant part of a landscape; the seen, or viewed, area located from 3–5 miles to infinity from the viewer
Existing Visual Condition (EVC) - the level of visual quality or condition presently occurring on the ground
Foreground - portion of viewed area from immediately adjacent to viewing position out to about a half mile from observer position; individual branches of trees are discernible
Future Visual Condition (FVC) - the level of visual quality or condition occurring on the ground at the end of the proposed harvest period
Maximum Modification - a visual quality objective which prescribes that an area may be dominated by management activities, but resulting visual characteristics should appear as a natural occurrence when viewed from the background distance
Middleground - the visible terrain beyond the foreground, where individual trees are still visible but do not stand out distinctly from the landscape; a half mile to five miles from the observer's position
Modification - a visual quality objective in which activities may visually dominate the original characteristic landscape, but resulting visual characteristics must resemble natural occurrences within the surrounding area when viewed from the middleground distance
Partial Retention - a visual quality objective in which management activities are to remain visually subordinate to the natural landscape
Preservation - a visual quality objective which permits ecological changes only; applies to wilderness areas and other special classified areas
Retention - a visual quality objective which provides for management activities that are not visually evident to the casual observer
Sensitivity Level - the measure of people's concern for scenic quality; three levels are assigned to land areas viewed from boat routes, anchorages, plane routes, roads, trails, public-use areas, and recreation cabins
Viewshed - a defined viewed landscape or panoramic vista seen from a road, marine waterway, or specific viewpoint
Visual Quality Objective (VQO) - measurable standards reflecting five degrees of acceptable alteration based on a landscape's diversity of natural features and the public's concern for high scenic quality

Introduction

The "visual landscape" is a basic resource, to be "treated as an essential part of and receive equal consideration with the other basic resources of the land" (Forest Service Manual 2380).

Since many landscapes visible from public travel routes in the Alaska region are susceptible to change in visual character as a result of timber harvest and

road-building activities, it has become necessary to both inventory the visual resource and provide measurable standards for the management of it.

The Visual Management System developed by the Forest Service provided the benchmark or starting point of the Project Area visual resource analysis. The three basic components of this system are as follows: the public's concern for scenic quality (Sensitivity Levels), the diversity of natural features in the landscape, and the distance from which the landscape is seen.

A detailed description of procedures and methods in conducting the visual resource inventory is included in Visual Management System Handbook No. 462, 1977.

Affected Environment

Landscape Character

Visual Character Type describes a large area of land that has common characteristics of landform, rock formations, water forms, and vegetative patterns. Character types serve as frames of reference for classifying the relative scenic quality of the land's physical features; and help establish criteria for determining Variety classes.

The Tongass National Forest is made up of six distinct character types. The CPOW Project Area contains two of these types: Kupreanof Lowlands and Coastal Hills (USDA Forest Service 1979b), separated by a line running diagonally from near the community of Klawock northeasterly to Luck Lake on the east coast. Both character types are covered by a dense coniferous forest broken by muskegs and muskeg lakes. The Kupreanof Lowlands character type, north of this boundary, comprises 54 percent of the Project Area; the Coastal Hills type, to the south, amounts to 46 percent.

Kupreanof Lowland

The Kupreanof Lowland visual character type encompasses the central portion of the Inside Passage, including the Wrangell Narrows; Chatham, Sumner, and Stikine straits; Duncan Canal; Salmon Bay Lake; and Frederick Sound. The area is made up of islands with rolling terrain and topographical relief varying from 300 to 1,500 feet, and separated by an intricate network of waterways. Mountains are scattered and block-like, rising to 3,500 feet above the lowlands. The shoreline is made up of many small bays, rock reefs, and occasional small gravel beaches. The hemlock/spruce forest dominates this character type, except for areas of higher elevations where alpine ecosystems are present.

Coastal Hill

The southern reaches of the Tongass are represented by the Coastal Hill visual character type, whose islands offer an extensive landform variety with elevations ranging from 1,000 to 4,500 feet. Areas less than 3,500 feet were glaciated and have rounded hummocky summits, knobs, and ridges. Generally, steep landforms to saltwater and an irregular rounded appearance are characteristic. Few streams are more than 10 miles long, but they are steep, and offer rapids, cascades, pools, etc. Dense conifer cover is prevalent, with some large areas of muskeg at higher elevations.

Coastal Hill Landscape

Visual Quality Objectives (VQO's)

VQO's are standards for managing visual change in the landscape. They suggest varying degrees of acceptable modification based on viewing distance, landscape character, and viewer interest in scenic quality. In areas of high scenic quality and high viewer interest, VQO's of Partial Retention or Retention refer to partial retention or retention of landscape character rather than of vegetative cover. These two VQO's suggest managing for little or no visible change in the landscape. VQO's of Modification and Maximum Modification indicate the area is rarely seen or is relatively low in scenic value, and change would not be noticeable or of great social consequence.

Visual Quality Objectives (VQO's)

Preservation (P)
Permits ecological changes only

Retention (R)
Activities are not evident to the casual visitor

Partial Retention (PR)
Activities may be evident but are visually subordinate to the natural landscape

Modification (M)
Activities may dominate the characteristic landscape, but should resemble natural occurrences when viewed from foreground or middleground

Maximum Modification (MM)
Activities may dominate the landscape, but should appear as natural occurrences when viewed as background

Visual Condition

Existing Visual Condition (EVC) represents the current level or degree of visible alteration presently occurring on the ground. Similiarly, Future Visual Condition (FVC) estimates the scenic quality level that would occur at the end of a proposed activity period. Existing and future visual condition may also be described in terms similar to those used to describe VQO's.

Visual condition ratings serve as tools for: 1) analyzing the current management situation, 2) estimating the effects of alternatives, 3) visual monitoring, and 4) recording a historical record of the degree and amount of physical alteration over time and space.

Natural. Areas in which only ecological change has taken place. Corresponds to the Preservation VQO.

Natural appearing. Areas in which changes in the landscape are not noticed by the average forest visitor unless pointed out. Corresponds to the Retention VQO.

Slightly altered. Areas in which changes in the landscape are noticed, but do not attract attention. Corresponds to the Partial Retention VQO.

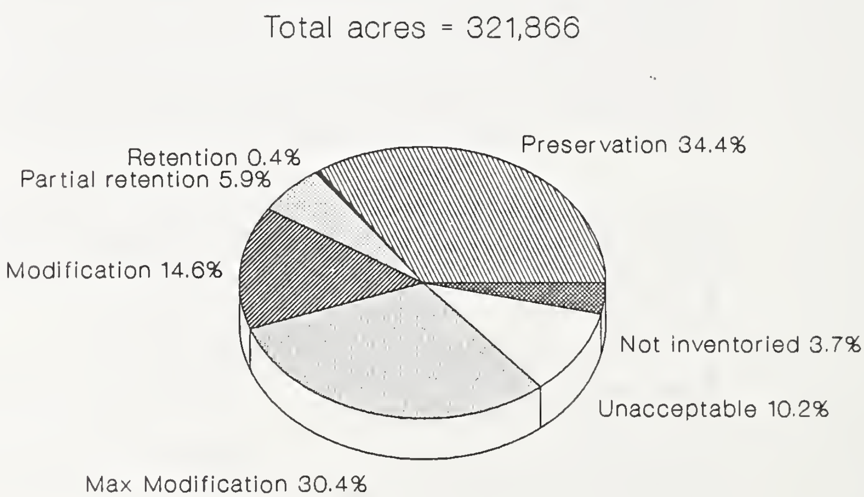
Moderately altered. Areas in which changes in the landscape are easily noticed and may attract attention. Corresponds to the Modification VQO.

Heavily altered. Areas in which changes in the landscape obviously appear to be major disturbances and stand out as a dominating impression of the landscape. Corresponds to the Maximum Modification VQO.

Drastically altered. Areas in which changes in the landscape are in glaring contrast to the natural appearance. Not a VQO; an unacceptable visual condition.

A summary of the inventoried EVC acres for the Project Area is presented in Figure 3-34.

Figure 3-34
Acres of Each EVC in the Project Area



The EVC inventory provides a baseline that: 1) compares a seen area's actual condition (degree of alteration) with the proposed VQO's, 2) assesses the cumulative visual impacts of alternatives, and 3) determines whether the proposed management activities and facilities will maintain the present conditions, lower the visual quality, and meet or not meet the proposed VQO's.

Project Area Viewsheds: General

Viewsheds differ from watersheds or VCU's in that their boundaries are defined only by visually seen areas as viewed from representative viewpoints. To assess the potential visual impacts of the different alternatives in relation to this EIS's proposed VQO's, specific viewpoints were identified for each viewshed. These viewpoints are based on the use areas identified in the Forest's visual resource inventory.

The most sensitive viewing position along Clarence Strait is from the Alaska Ferry and cruiseship route, which averages approximately three miles off the Prince of Wales coast (middleground). Along the West Coast Waterway, the sensitive viewing position is anywhere from a few hundred yards to a mile off shore (foreground to near middleground), Along Whale–Honker, which includes recreation sites, the sensitive position is from the observer position to two or three miles (immediate foreground to middleground).

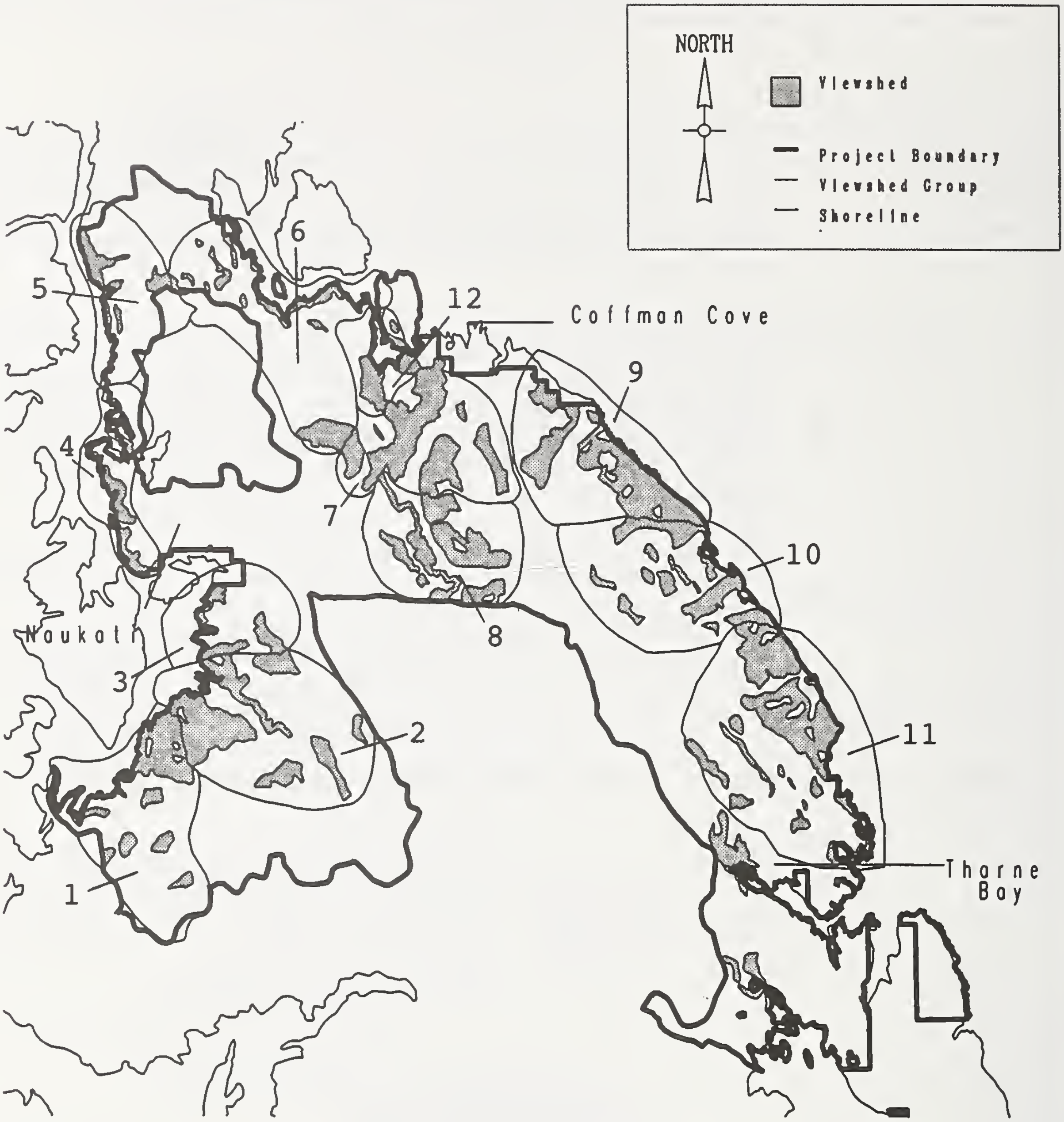
These associated viewsheds are divided into three categories based on their present visual condition: (1) heavily altered, (2) moderately altered, and (3) slightly altered.

Table 3-80 lists each viewshed by category and displays the percentage of alteration since 1954. Locations of these viewsheds in the Project Area are shown in Figure 3-35.

Table 3-80
Project Area Viewsheds, by Name And Percent Altered

Heavily Altered	Moderately Altered	Slightly Altered
WC Waterway - Staney (42%)	WC Waterway - Shaheen (19%)	Whale Pass (4%)
WC Waterway - Kussan (52%)	WC Waterway - Sarheen (25%)	Sweetwater Lake (8%)
WC Waterway - Sarkar (35%)	Hatchery Creek (28%)	Barnes Lake (14%)
Clarence - Ratz Harbor (26%)	Clarence - Baird Peak (18%)	
	Clarence - Sal Creek (26%)	

Figure 3-35
CPOW Viewshed Location Map



Central Prince of Wales FEIS Viewsheds

1. West Coast Waterway at Shaheen Creek
2. West Coast Waterway at Staney Creek
3. West Coast Waterway at Kussan Point
4. West Coast Waterway at Sarkar Cove
5. West Coast Waterway at Sarheen Creek
6. Whale Passage
7. Sweetwater Lake
8. Hatchery Creek & Canoe Route
9. Clarence Strait at Baird Peak
10. Clarence Strait at Ratz Harbors
11. Clarence Strait at Sal Creek
12. Barnes Lake

Proposed Visual Quality Objectives (VQO's)

For this project, VQO's have been established for 12 specific viewsheds, and represent the visual resource guideline direction for this EIS. They were developed from the Ketchikan Area visual resource inventory. TLMP (as amended, 1986) and recent management direction state that all other lands within the Project Area will either be managed for Maximum Modification or else will not be affected by the proposed harvest units. The proposed VQO's for this project are summarized in Table 3-81, and are displayed in Figure 3-36.

Table 3-81
Proposed Viewshed VQO's, by Distance Zone

	Foreground	Middleground	Background
Priority Viewsheds			
W.C. Waterway-Shaheen	M	MM	MM
W.C. Waterway-Staney	M	MM	MM
W.C. Waterway-Kussan	M	MM	*
W.C. Waterway-Sarkar	M	MM	*
W.C. Waterway-Sarheen	PR	M	*
Whale Pass	PR	M	*
Barnes Lake	PR	M	*
Sweetwater Lake	PR	M	*
Hatchery/Canoe Route	R	PR	*
Clarence-Baird Peak	*	M	*
Clarence-Ratz Harbors	*	M	M
Clarence-Sal Creek	*	M	M

MM = Maximum Modification M = Modification PR = Partial Retention R = Retention
* These distance zones do not apply within these viewsheds.

"W.C. Waterway" means saltwater passages along the West Coast of Project Area.
R=Retention PR=Partial Retention M=Modification MM=Maximum Modification

Table 3-82 shows the current and proposed visual condition of the 12 viewsheds.

Table 3-82
Inventory and Proposed VQO's, in Seen Acres

Viewsheds	Size	Type	Visual Quality Objective (VQO) R	PR	M	MM
Shaheen Crk	6,769	Inventory	1,712	3,823	1,234	0
		Proposed	0	0	1,179	5,590
Staney Crk	8,285	Inventory	1,913	5,909	374	89
		Proposed	928	661	325	6,371
Kussan Pt	1,782	Inventory	715	409	644	14
		Proposed	0	0	715	1,067
Sarkar Cove	2,429	Inventory	1,239	1,190	0	0
		Proposed	0	255	1,059	1,115
Sarheen	2,068	Inventory	0	1,206	862	0
		Proposed	0	637	689	742
Whale Pass	4,184	Inventory	613	2,702	869	0
		Proposed	0	1,735	2,221	228
Barnes Lake	2,220	Inventory	1,808	412	0	0
		Proposed	0	1,808	412	0
Sweetwater	8,082	Inventory	3,663	4,419	0	0
		Proposed	0	3,663	4,419	0
Hatchery	6,042	Inventory	0	2,980	3,062	0
		Proposed	1,644	4,398	0	0
Baird Peak	7,416	Inventory	0	6,891	525	0
		Proposed	0	0	7,416	0
Ratz Harbors	5,369	Inventory	138	5,144	87	0
		Proposed	0	0	5,369	0
Sal Creek	9,853	Inventory	732	9,121	0	0
		Proposed	0	517	9,336	0
Viewshed Totals	64,499	Inventory	12,533	44,206	7,657	103
		Proposed	2,572	13,674	33,140	15,113
% Change from Inventory			- 80%	- 69%	+ 77%	+ 99%

Table 3-83 shows the acres within each VCU which are seen from one of the 12 managed viewsheds. It also displays the acreage within each VQO.

Table 3-83
Proposed VCU VQO's, in Seen Acres

			Visual Quality Objective (VQO)			
VCU	Acres	Seen Acres	R	PR	M	MM
549.2	5,148	1,851	0	635	606	610
550.0	8,480	525	0	0	173	352
551.0	2,421	1,689	0	1,131	558	0
552.0	8,165	2,611	0	945	1,425	241
553.0	7,520	471	0	60	127	284
554.2	8,873	949	0	251	663	35
557.0	3,141	1,722	0	0	668	1,054
571.0	16,613	1,482	0	0	367	1,115
572.0	7,604	867	0	0	867	0
573.0	26,008	10,308	78	4,818	5,412	0
574.0	13,659	5,876	1,599	4,277	0	0
577.0	13,625	207	0	51	73	83
579.0	10,710	2,879	0	0	851	2,028
580.0	15,393	1,893	0	1,874	19	0
581.0	20,008	3,204	0	0	3,204	0
582.0	4,014	3,620	0	0	3,620	0
583.0	12,242	3,787	0	0	3,787	0
584.0	13,476	7,402	0	0	7,402	0
585.0	10,439	2,163	0	0	2,163	0
586.0	15,282	2,045	0	1,435	438	172
587.1	7,842	6,174	461	0	1,090	4,623
588.0	26,634	5,162	477	661	170	3,854
589.0	20,028	4,349	0	0	588	3,761
590.0	13,786	383	0	0	0	383
598.0	12,929	1,487	0	0	318	1,169
599.0	6,363	1,385	0	0	1,385	0
600.0	3,213	2,952	0	0	2,952	0
601.0	1,343	63	0	0	0	63
PROJECT	321,681	77,506	2,615	16,138	38,926	19,827
TOTALS		24.0%	3.4%	20.8%	50.2%	25.6%

R = Retention PR = Partial Retention M = Modification MM = Maximum Modification

Figure 3-36
CPOW Proposed VQO Map

Effects of the Alternatives

Direct Effects

The direct effects of alternative timber harvest proposals have been analyzed with respect to the 12 identified sensitive viewsheds described in the previous section. The following discussion will cover the visual impacts of the proposed action alternatives within the 12 viewsheds and will describe them in relation to their location in the Project Area, their landscape or terrain character, and an assessment of their existing visual quality level expressed in terms of VQO's. Viewshed and unit size refer to seen area only.

Each alternative discussion will describe the Visual Condition (VC) that would result at the end of this EIS harvest period. Every harvest unit in every alternative has been designed so that it fully meets the prescribed VQO.

Viewsheds are described in the following order: geographically from the junction of Karheen Pass and Tuxekan Pass on the West Coast Waterway, north along the Waterway past the Staney Creek and Sarkar Cove recreation areas to the Neck Lake area, then east and south along Whale Passage to the Honker Divide recreation complex, and finally east and south along the Clarence Strait, to the Sal Creek and Sandy Beach Picnic Areas. (See Key Viewshed Location Map, Figure 3-35.)

WEST COAST WATERWAY REGION

The first five viewsheds comprise the West Coast Waterway's seen area and is made up of VCU's 549, 554, 557, 571, 587, 588, and 589. These VCU's total 90,040 acres with 24 percent classified seen area (21,333-acres). Thirty percent (or 26,996 acres) of the total VCU acreage and 76 percent (or 16,110 acres) of the seen area has been harvested since 1954.

West Coast Waterway at Shaheen Creek Viewshed

This 6,769-acre saltwater viewshed, in VCU 589 and a portion of VCU 587, is located in the southwest area of the Project Area and is seen generally from a distance of 3–4 miles on the West Coast Waterway at the junction of Karheen and Tuxekan passages. Mariners navigating Karheen Pass must closely watch the water, charts, and fathometers because of the many submerged obstacles; consequently, the duration of the view is somewhat short. The view of Shaheen is mainly in the middle and background. The view direction is southeast to east, and its landscape character consists of a relatively flat foreground of beach fringe vegetation with a few middleground knobs rising steeply to the background peaks of 2,200-foot Staney Cone and 2,900-foot Kogish Mountain. On the northern edge of the viewshed, in the middleground rises 2,600-foot Twin Mountain.

Existing Visual Condition. This viewshed currently appears as heavily altered. Nineteen percent or 1,277 acres have been harvested in this viewshed since 1954; of these, nearly 84 percent, or 1,071 acres, were cut in the past 20 years. Currently, this viewshed meets the proposed Modification VQO for foreground and the Maximum Modification VQO for the middle and background slopes.

Alternatives 1 and 1a

Under these two alternatives no additional harvest is proposed and the Future Visual Condition (FVC) for this viewshed would remain the same except for continuing change in tree height, color and texture.

Alternatives F2–F6

Alternatives F4 and F6 would propose the most harvest, with the same four units or 84 seen acres, while Alternative F2 proposes only one unit or 26 seen acres. Alternatives F3 and F5 each propose three units with 59 seen acres and 56 acres respectively. As proposed, all units in all alternatives will meet the proposed VQO's of Modification and Maximum Modification.

Table 3-84 summarizes the effects of the alternatives on the Shaheen Creek viewshed. Both existing and cumulative Visual Disturbance (VD) are shown by seen acres and percent.

Table 3-84
Effects on Shaheen Creek Viewshed

	Summary of the Alternatives					
	1 & 1A	F2	F3	F4	F5	F6
Viewshed Acres	6,769					
Existing VD–Acres	1,277					
Existing VD–Percent	19					
No. of Units Proposed	0	1	3	4	3	4
No. of Acres	0	26	59	84	58	84
Cumulative VD–Acres	1,277	1,303	1,336	1,361	1,335	1,361
Cumulative VD–Percent	19	19	20	20	20	20

SOURCE: Angelus 1993

West Coast Waterway at Staney Creek Viewshed

This 8,285-acre saltwater viewshed in VCU 587 and VCU 588 is located four miles south of the Naukati logging camp. The viewpoint is oriented mostly due east, one mile from the mouth of Staney Creek and its recreation cabin. The landscape character consists of two 1,000-foot mountains, with steep-sided slopes rising to the north. Due east in the far middleground (4–5 miles) are the slopes above Forest Road 20. Dominating the southern portion of this viewshed, the 2,600-foot Twin Mountain complex exposes a steep, heavily forested escarpment to viewers along the waterway.

Existing Visual Condition. This heavily altered viewshed reflects extensive harvesting in the mid-1970's. Forty-two percent or 3,517 acres have been harvested in this viewshed since 1954; of these, nearly 35 percent, or 2,868 acres, were cut in the past 20 years. Large, continuous clearcuts dominate the slopes above the Staney Creek cabin and campground. To the south, a large 561-acre clearcut on the steep-faced slope of Twin Mountain faces the viewer and is seen as far away as the entrance to Sarkar Cove to the north, over 10 miles away. The regenerating forest is nearing 20–30

feet in height with a few areas, namely the mountaintops and distant ridges, covered with old-growth forest.

Currently, this viewshed meets the proposed VQO of Modification in the foreground and Maximum Modification in the middleground. For the foreground areas (1/4 to 1/2 mile) along Staney Creek, the proposed VQO is Partial Retention; from the Forest recreation cabin, the foreground view has a proposed VQO of Retention.

Alternatives 1 and 1A

Under these alternatives, no additional harvest is proposed and the Future Visual Condition (FVC) would remain heavily altered except for continuing change in tree heights, color and texture.

Alternatives F2 through F6

No harvest is proposed within the seen foreground areas along Staney Creek and near the recreation cabin, nor on the steep-sided slopes of Twin Mountain. Alternatives F2, F3, F4 and F5 propose the same six units or 189 seen acres, while Alternative F6 would propose the most harvest with 267 seen acres in five units. Most of these proposed units are leave islands, and when harvested would reduce the apparent disparity between the large expanse of the new, regenerating forest and the vertical blocks of old-growth forest. As proposed, all units in all alternatives will meet the proposed VQO's of Modification and Maximum Modification. The Future Visual Condition would remain heavily altered.

Table 3-85 summarizes the effects of the alternatives on the Staney Creek viewshed. Both existing and cumulative Visual Disturbance (VD) are shown by seen acres and percent.

Table 3-85
Effects on Staney Creek Viewshed

	Summary of the Alternatives					
	1 & 1A	F2	F3	F4	F5	F6
Viewshed Acres	8,285					
Existing VD-Acres	3,517					
Existing VD-Percent	42					
No. of Units Proposed	0	6	6	6	6	5
No. of Acres	0	189	189	189	189	267
Cumulative VD-Acres	3,517	3,706	3,706	3,706	3,706	3,784
Cumulative VD-Percent	42	45	45	45	45	46

SOURCE: Angelus 1993

West Coast Waterway at Kussan Point Viewshed

This 1,782-acre saltwater viewshed (the smallest in the CPOW Project Area) in VCU 571 and VCU 587 is located just north of the Staney Creek recreation complex as seen from one-mile offshore of Kussan Point. The view direction is southeast to east, four miles to middleground 1,000-foot ridges above Forest Road 20. The landscape character of the terrain is that of rolling 200- to 500-foot terrain in the foreground and to the left (north) of the viewshed. Beyond the foreground there are interspersed unseen lakes and muskegs; the background is defined by 1,000-foot ridges four miles distant. On the right (southern) edge of the viewshed is a prominent east-west 1,000-foot ridge rising abruptly from shoreline.

Existing Visual Condition. This viewshed appears as heavily altered. Fifty-two percent or 927 acres have been harvested since 1954; of these, nearly 25 percent, or 454 acres, were harvested in the past 20 years. Currently, this viewshed meets the proposed VQO's of Modification in the foreground and Maximum Modification in the middleground.

Alternatives 1 and 1a

Under these two no-action alternatives, no additional harvest is proposed and Future Visual Condition would remain heavily altered except for continuing change in the differences of tree heights, colors, and texture between the regenerating new forest and the existing old-growth stands.

Alternatives F2 through F6

Of the action alternatives, Alternative F6 proposes the fewest number of seen units (5), and Alternative F4 proposes the most units (7) and seen acreage (199 of 306 acres). Alternatives F2 and F3 propose the same number of units (6) and seen acreage (125 acres of 195). Alternative F5 proposes six units (183 of 277 acres). All units in all alternatives meet the proposed VQO's. The FVC would remain heavily altered due to nearly 27 percent, or 473 acres, of existing clearcuts nearing 30–35 feet in regenerated height, which reduces the visual impact of those extensive past harvests.

Table 3-86 summarizes the effects of the alternatives on the Kussan Point viewshed. Both existing and cumulative Visual Disturbance (VD) are shown by seen acres and percent.

Table 3-86
Effects on Kussan Point Viewshed

	Summary of the Alternatives					
	1 & 1A	F2	F3	F4	F5	F6
Viewshed Acres	1,782					
Existing V.D. Acres	927					
Existing V.D. Percent	52					
No. of Units Proposed	0	6	6	7	6	5
No. of Acres	0	125	125	199	183	89
Cumulative VD-Acres	927	1,052	1,052	1,126	1,110	1,016
Cumulative VD-Percent	52	59	59	63	62	57

SOURCE: Angelus 1993

West Coast Waterway at Sarkar Cove Viewshed

This 2,429-acre saltwater viewshed in VCU 554 and VCU 557 is located near Naukati logging camp at the Tuxekan Narrows north to past the entrance of Sarkar Cove to Rocky Point. The landscape character of this viewshed is comprised of foreground beach fringe vegetation with occasional views of hills and the mountain slopes above the Sarkar Lakes area in the middleground.

Existing Visual Condition. This viewshed ranges from slightly altered to moderately altered. Extensive harvesting in the early 1960's, just back of the beach fringe, has now regenerated to approximately 35–45 feet in height. More recent (1980's) harvesting appears higher up on the ridgetop crowns. Thirty-five percent or 859 acres have been harvested in this viewshed since 1954; of those, nearly 50 percent, or 431 acres, were cut in the past 20 years.

Currently, this viewshed meets the proposed VQO's of Modification in the foreground and Maximum Modification in the middleground south of the Sarkar Cove area; it also meets the proposed VQO's of Partial Retention and Modification in the Sarkar Cove to Clam Cove area.

Alternatives 1 and 1a

Under these two no-action alternatives, no additional harvest is proposed and Future Visual Condition would remain slightly altered to moderately altered, except for continuing change in the differences of tree heights, colors, and texture between the regenerating new forest and the existing old-growth stands.

Alternatives F2 through F6

Of the action alternatives proposed, only Alternative F6 would not harvest in this viewshed. Alternatives F3, F4, and F5 propose the same two units of 58 seen acres—Units 554-225 near Clam Cove and Unit 557-200B on a knob in the middleground above Tuxekan Narrows. Alternative F2 proposes one harvest unit, Unit 557-200B, of 46 seen acres. Since none of these units would add appreciably to the disturbed appearance in this viewshed, all units in all alternatives would meet the VQO's. The FVC range would be moderately altered to heavily altered.

Table 3-87 summarizes the effects of the alternatives on the Sarkar Cove viewshed. Both existing and cumulative Visual Disturbance (VD) are shown by seen acres and percent.

Table 3-87
Effects on Sarkar Cove Viewshed

	Summary of the Alternatives					
	1 & 1A	F2	F3	F4	F5	F6
Viewshed Acres	2,429					
Existing VD-Acres	859					
Existing VD-Percent	35					
No. of Units Proposed	0	1	2	2	2	0
No. of Acres	0	46	58	58	58	0
Cumulative VD-Acres	859	905	917	917	917	859
Cumulative VD-Percent	35	37	38	38	38	35

SOURCE: Angelus 1993

West Coast Waterway at Sarheen Creek Viewshed

This 2,068-acre saltwater viewshed in VCU 549 and VCU 550 is located from Rocky Point north to a point opposite Devilfish Bay, approximately 7 miles. The landscape character is similar to the previous viewshed, with mainly foreground views interspersed with views of a 700-foot shelf-like ridge above Forest Road 20 (unseen) and the 1,800-foot mountain ridges above the Sarkar Lakes area in the middleground.

Existing Visual Condition. This viewshed's current visual condition ranges from slightly altered to moderately altered. Twenty-five percent or 517 acres have been altered since 1954, all in the past 20 years. Currently, this viewshed meets the proposed VQO's of Partial Retention in the foreground and Modification in the middleground.

Alternatives 1 and 1a

Under these two no-action alternatives, no additional harvest is proposed and Future Visual Condition (FVC) would remain slightly altered to moderately altered, except for continuing change in the differences of tree heights, colors, and texture between the regenerating new forest and the existing old-growth stands.

Alternatives F2 through F6

Action alternatives F2 and F6 would not propose any further harvesting in this viewshed. Alternatives F3, F4, and F5 propose the same two contiguous units of 23 seen acres, Unit 549-205 and Unit 549-206, along a ridgetop in the near middleground and would meet the proposed VQO of Modification. The FVC would change to moderately altered.

Table 3-88 summarizes the effects of the alternatives on the Sarheen Creek viewshed. Both existing and cumulative Visual Disturbance (VD) are shown by seen acres and percent.

Table 3-88
Effects on Sarheen Creek Viewshed

	Summary of the Alternatives					
	1 & 1A	F2	F3	F4	F5	F6
Viewshed Acres	2,068					
Existing VD-Acres	517					
Existing VD-Percent	25					
No. of Units Proposed	0	0	2	2	2	0
No. of Acres	0	0	23	23	23	0
Cumulative VD-Acres	517	517	540	540	540	517
Cumulative VD-Percent	25	25	26	26	26	25

SOURCE: Angelus 1993

WHALE-HONKER REGION

The Whale–Honker Region combines the next four viewsheds to make up the bulk of the Honker Divide recreation complex within the CPOW Project Area. These are composed of VCU's 550-552, 573-574, and 577. These VCU's total 171,094 acres, with 12 percent or 21,216 acres classified seen area. Nearly 9 percent of the total VCU acreage and 37 percent of the seen area has been harvested since 1954.

Whale Pass Viewshed

This 4,184-acre saltwater viewshed in VCU's 550, 551, 552, and 573 is located along the south shoreline of Whale Passage from its entrance between Thorne Island and Stevenson Island in the east, past Mabel Island, then north to the log transfer site (LTF) near the community of Whale Pass. Whale Passage provides saltwater access to the community of Whale Pass, and recreational activities on Barnes Lake, Sweetwater Lake and Hatchery Lake to the south. The view direction is of the southern and western shorelines. The landscape character is composed primarily of foreground (0 to 1/2 mile) shoreline views of low elevation (200 to 600 feet) ridges and knobs, and middleground views of mountain ridges and slopes to the south above Sweetwater Lake and Mabel Creek and the 1,800-foot ridges above the Sarkar Lake recreation area.

Existing Visual Condition. The visual appearance of this viewshed ranges from natural condition to slightly altered. This results from small entries along the shoreline (176 acres or four percent) logged by A-frame in the early 1960's. The regenerating forest is nearing 30–40 feet in height, its green color is deepening, the canopy is beginning to close, and its texture is beginning to diversify. The viewshed at this time meets the VQO's of Partial Retention and Modification.

Alternatives 1 and 1a

Under these two no-action alternatives, no additional harvest is proposed and Future Visual Condition (FVC) would remain in a natural condition to slightly altered state except for continuing change in the differences of tree heights, colors, and texture between the regenerating new forest and the existing old-growth stands.

Alternatives F2 through F6

Of the action alternatives, Alternative F3 proposes the most units (8) with 193 seen acres, and is the only one to propose three units on the south shore foreground slopes—Unit 551-249, Unit 551-254, and Unit 552-201, at 15, 18 and 20 seen acres respectively. Alternative F6 proposes the fewest units (4), with 120 seen acres. Alternatives F4 and F5 propose six units at 197 and 190 seen acres. Alternative F2 proposes an additional unit (total of 7) at 206 seen acres, the most of all the alternatives.

As proposed, all units in all alternatives would meet the proposed VQO's. The FVC would remain the same if Alternative F6 were implemented. For Alternatives F2, F4 and F5, the FVC would change to slightly altered. For Alternative F3 the FVC would change to a range of slightly altered to moderately altered.

Table 3-89 summarizes the effects of the alternatives on the Whale Pass viewshed. Both existing and cumulative Visual Disturbance (VD) are shown by seen acres and percent.

Table 3-89
Effects on Whale Pass Viewshed

		Summary of the Alternatives				
	1 & 1A	F2	F3	F4	F5	F6
Viewshed Acres	4,184					
Existing VD-Acres	176					
Existing VD-Percent	4					
No. of Units Proposed	0	7	8	6	6	4
No. of Acres	0	206	194	197	190	120
Cumulative VD-Acres	176	382	370	373	366	296
Cumulative VD-Percent	4	9	9	9	9	7

SOURCE: Angelus 1993

Barnes Lake Viewshed

This 2,220-acre saltwater viewshed in VCU's 552 and 573 is located just south of Whale Pass and north of Sweetwater Lake. This lake is actually a tidewater zone receiving fresh water from the Sweetwater and Hatchery Creek system to the south and salt water from two saltchucks on either side of Stevenson Island. Barnes Lake is the northern terminus of the Hatchery Creek/Thorne River Wild, Scenic and Recreation river corridor. This viewshed, with its Forest recreation cabin on the western shore, would be visually managed for Partial Retention of its foreground landscape character, and to allow Modification of the middleground viewed areas.

Existing Visual Condition. The visual appearance of this viewshed ranges from natural condition to slightly altered. Nearly 14 percent or 309 acres have been harvested on the eastern slopes of this viewshed since 1954; of these, 50 percent or 155 acres were cut in the past 20 years. Currently, this viewshed meets the proposed VQO's of Partial Retention and Modification.

Alternatives 1 and 1a

Under these two no-action alternatives, no additional harvest is proposed and Future Visual Condition (FVC) would remain in a natural condition to slightly altered state, except for continuing change in the differences of tree heights, colors, and texture between the regenerating new forest and the existing old-growth stands.

Alternatives F2 through F6

Of the five action alternatives, only Alternative F3 proposes harvest in this viewshed. Unit 552-273, of which 11 acres would be seen in the middleground, would meet the proposed Modification VQO. The FVC would be slightly altered on the eastern slopes and would stay in a natural condition around the cabin and in the remainder of this viewshed.

Table 3-90 summarizes the effects of the alternatives on the Barnes Lake viewshed. Both existing and cumulative Visual Disturbance (VD) are shown by seen acres and percent.

Table 3-90
Effects on Barnes Lake Viewshed

	Summary of the Alternatives					
	1 & 1A	F2	F3	F4	F5	F6
Viewshed Acres	2,220					
Existing VD-Acres	309					
Existing VD-Percent	14					
No. of Units Proposed	0	0	1	0	0	0
No. of Acres	0	0	11	0	0	0
Cumulative VD-Acres	309	309	320	309	309	309
Cumulative VD-Percent	14	14	15	14	14	14

SOURCE: Angelus 1993

Sweetwater Lake Viewshed

This 8,082-acre freshwater lake viewshed is located three to four miles southwest of the community of Coffman Cove in VCU 573 and VCU 577. Sweetwater Lake with its Forest Service cabin is a high-use recreational area and is within the Thorne River/Hatchery Creek Wild, Scenic and Recreational River corridor. The landscape character consists of the steep mid-slopes and rounded 1,200-foot ridgetops to the west (as seen from the cabin). To the east and west (as seen from a boater's perspective), steep-sided slopes rise to nearly 2,000 feet above this lake. Forest Road 3030 is located alongside the lake's eastern edge (unseen from the lake).

Existing Visual Condition. The visual appearance of this viewshed varies depending on viewpoint and view direction. Previous harvest activities in this viewshed have taken place on the lower slopes, with all disturbance seen from the lake and none from the cabin. Nearly 8 percent or 613 seen acres have been harvested in this viewshed since 1954. From the lake, views to the east and west appear as slightly altered, while the view to the north is natural appearing. To the south, in the far

middleground (4 miles), the view appears as moderately altered. Views from the cabin have proposed VQO's of Retention in the foreground and Partial Retention in the middleground. Views from the lake proper have proposed VQO's of Partial Retention in the foreground and Modification in the middleground. At this time, this viewshed meets the proposed VQO's from the cabin and from the rest of the lake.

Alternatives 1 and 1a

Under these two no-action alternatives, no additional harvest is proposed and Future Visual Condition (FVC) would remain the same, except for continuing change in the differences of tree heights, colors, and texture between the regenerating new forest and the existing old-growth stands.

Alternatives F2 through F6

Alternative F3 would propose the most seen harvest with four units or 112 acres, while Alternative F2 proposes one unit with 48 acres. Alternatives F4 and F6 propose two units of 85 acres and four units with 109 acres, respectively. As proposed, all units in all alternatives would meet the VQO's. The FVC would change on the western slopes to moderately altered, while the slopes to the east would remain slightly altered. The views from the recreation cabin are unaffected by the proposed harvest and would remain in a natural appearing condition.

Table 3-91 summarizes the effects of the alternatives on the Sweetwater Lake viewshed. Both existing and cumulative Visual Disturbance (VD) are shown by seen acres and percent.

Table 3-91
Sweetwater Lake Viewshed

		Summary of the Alternatives				
	1 & 1A	F2	F3	F4	F5	F6
Viewshed Acres	8,082					
Existing VD-Acres	613					
Existing VD-Percent	8					
No. of Units Proposed	0	1	4	2	0	4
No. of Acres	0	48	112	85	0	109
Cumulative VD-Acres	0	661	725	698	613	722
Cumulative VD-Percent	0.0	8	9	9	8	9

SOURCE: Angelus 1993

Hatchery Lake Viewshed

This 6,042-acre freshwater lake viewshed is located three miles south of Sweetwater Lake in VCU 573 and VCU 574. This lake and creek are part of the Honker Divide Canoe Route and are within the Thorne River/Hatchery Creek Wild, Scenic and Recreational river corridor. Views from the lake have proposed VQO's of Retention in the foreground and Partial Retention in the middleground. Views from the river corridor are limited to the stream course due to the visual buffering of the old-growth forest bordering it. The landscape character as seen from the lake consists of steep

mid-slopes and rounded 1,000-foot mountaintops to the west; steep-sided slopes rise to nearly 1,600 feet on the east and southeast.

Existing Visual Condition. The visual appearance of this viewshed is moderately altered, reflecting extensive recent harvest in the middleground views. Fifteen percent or 921 acres have been harvested here since 1954, with some of the more recent harvest in the fore-, middle-, and backgrounds visible to boaters using the lake. The regenerating forest has attained only 5–15 feet in height, and the visual impacts remain dominating due to exposed slash. Because of this harvesting, this viewshed currently does not meet the proposed VQO's of Retention and Partial Retention.

Alternatives 1 and 1a

Under these two no-action alternatives, no additional harvest is proposed and Future Visual Condition (FVC) would remain moderately altered, except for continuing change in the differences of tree heights, colors, and textures between the regenerating new forest and the existing old-growth stands.

Alternatives F2 through F6

Alternative F6 proposes the most harvest (two units of 69 seen acres) and alternatives F2–F5 each propose two units. Unit 574-239, proposed only in F6, is located high (over 1,600 feet) on the eastern slope directly facing the viewer. This 58-acre unit may also be seen as far away as Lake Galea (Honker Lake) on the Thorne River to the south (4 miles) and Sweetwater Lake (5 miles) to the north (downriver on Hatchery Creek). In order to retain this river corridor's Scenic status, manage for minimal commodity production, and meet the Partial Retention VQO, the IDT proposed a shelterwood with reserve tree silvicultural prescription for this unit. This would reduce dominating visual impacts to the visitor.

Table 3-92 summarizes the effects of the alternatives on the Hatchery Lake viewshed. Both existing and cumulative Visual Disturbance (VD) are shown by seen acres and percent.

Table 3-92
Effects on Hatchery Lake Viewshed

		Summary of the Alternatives				
	1 & 1A	F2	F3	F4	F5	F6
Viewshed Acres	6,042					
Existing VD-Acres	921					
Existing VD-Percent	15					
No. of Units Proposed	0	2	2	2	2	2
No. of Acres	0	15	24	15	15	69
Cumulative VD-Acres	921	936	945	936	936	990
Cumulative VD-Percent	15	15	16	15	15	16

SOURCE: Angelus 1993

CLARENCE STRAIT REGION

Area Three combines the following three viewsheds and comprises all seen areas along Clarence Strait. These areas are made up of VCU's 572, 579, and 581 through 586. These VCU's total 93,775 acres with 28 percent (or 25,967 acres) classified seen area. Nearly 25 percent (or 23,140 acres) of the total VCU acreage and 38 percent (or 9,856 acres) of the seen area has been harvested since 1954.

Clarence Strait at Baird Peak Viewshed

This 7,416-acre saltwater viewshed in VCU 581 and VCU 582 is located along Clarence Strait on the east coast of the Project Area. Clarence Strait is the primary marine travel route used by the State ferries and many cruiseships. Their routes are approximately three or four miles offshore, and this viewshed is seen as middleground with a proposed VQO of Modification. Its landscape character consists of heavily vegetated, moderately steep slopes, rising to an approximately 1,400-foot plateau, then quickly rising to nearly 3,000 feet in the southern part of this viewshed. In the north, the highest area is a 1,200-foot plateau.

Existing Visual Condition. The visual appearance of this viewshed ranges from natural appearing in the south below Baird Peak, to moderately altered in the Eagle Creek area, to heavily altered from Coffman Cove to Eagle Creek. Eighteen percent or 1,799 acres have been harvested since 1954, with most located north of Eagle Creek and on the slopes above Luck Lake to the west. At this time, this viewshed meets the proposed Modification VQO.

Alternatives 1 and 1a

Under these two no-action alternatives, no additional harvest is proposed and Future Visual Condition (FVC) would remain the same, except for continuing change in the differences of tree heights, colors, and textures between the regenerating new forest and existing old-growth stands.

Alternatives F2 through F6

All five action alternatives propose entries in this viewshed, with alternatives F2, F5 and F6 each offering nine units, while F3 and F4 offer eight and seven units respectively. Five of the units proposed are scattered in the unharvested, southern half of the viewshed along the shore just back of the beach fringe buffer. This buffer visibly blocks much of the impact on the viewer, especially close to shore. As proposed all units in all alternatives will meet the proposed VQO. The FVC will change from natural appearing to moderately altered in the southern half (VCU 582) of this viewshed, while the northern half will remain heavily altered.

Table 3-93 summarizes the effects of the alternatives on the Baird Peak viewshed. Both existing and cumulative Visual Disturbance (VD) are shown by seen acres and percent.

Table 3-93
Effects on Baird Peak Viewshed

	Summary of the Alternatives					
	1 & 1A	F2	F3	F4	F5	F6
Viewshed Acres	7,416					
Existing VD-Acres	1,336					
Existing VD-Percent	18					
No. of Units Proposed	0	9	8	7	9	9
No. of Acres	0	345	293	241	365	373
Cumulative VD-Acres	1,336	1,681	1,629	1,577	1,701	1,709
Cumulative VD-Percent	18	23	22	21	23	23

SOURCE: Angelus 1993

Clarence Strait at Ratz Harbors Viewshed

This 5,369-acre saltwater viewshed in VCU 583 and the northern portion of VCU 584 is located immediately south of Baird Peak along Clarence Strait. These harbors and valleys are seen as middleground from the marine travel route with a proposed VQO of Modification. The landscape character is defined by two 1,000- to 1,300-foot ridges oriented more or less perpendicular to the coastline and harbor area. The steep mid-slopes and sharply defined ridgetops form dramatic, though oblique, backdrops as seen from the ferry or cruiseship route.

Existing Visual Condition. This viewshed currently ranges from moderately altered in the Little Ratz area to heavily altered in the Big Ratz area. Nearly 29 percent or 1,540 acres have been harvested since 1954. Although most of the previous harvest was in the early to mid-1960's, it was confined to the lower valleys and oblique, low visibility slopes. This regenerating forest is nearing 25–30 feet in height. Recently, however, harvest has taken place on steep slopes facing the viewer and is included in the existing harvest figure of 1,540 acres.

Currently, in the Little Ratz Harbor area, this viewshed meets the proposed Modification VQO. The Big Ratz Harbor area, being heavily altered, does not meet the proposed VQO of Modification. The current visual condition is in Maximum Modification.

Alternative 1 - After Completion of 1989-94 Harvesting

Two seen units from the 1989-94 EIS remain to be harvested, but are included in the 1,540 acres of existing harvest mentioned above. These units, Unit 583-100 and Unit 583-103, total 146 seen acres and are immediately adjacent to and above the harbor (cove) area on a southeast facing steep-sided slope of the Baird Mountain block. In addition to these units, previous harvest from the 1984-89 EIS period is seen farther back along the same slope. Just to the south of these units rises a prominent 1,200-foot east-to-west aligned ridge with extensive clearcuts from the same EIS period. Coupled with older harvesting apparent on nearly all seen surfaces (although quite green and textured), this viewshed would not meet the proposed VQO of Modification, but would meet a non-proposed Maximum Modification VQO. Assuming

these 1989-94 EIS units are harvested as planned, the Future Visual Condition (FVC) would remain heavily altered.

Alternative 1a - Before Completion of 1989-94 Harvesting

There are no units proposed for harvest in this alternative including the 1989-94 EIS units noted above. As described in the existing visual condition section above, the Big Ratz area does not meet the proposed Modification VQO. The FVC would, therefore, remain heavily altered and would remain moderately altered in the Little Ratz area.

Alternatives F2 through F6

All alternatives propose timber harvest in this viewshed with Alternatives F2 and F6 potentially having the most effect, with seven units (233 seen acres); Alternative F3 proposes the fewest units (three, with 23 seen acres). Alternatives F4 and F5 propose seven units (205 seen acres) and five units (139 seen acres), respectively.

Currently, the Big Ratz Harbor area exceeds Modification. Unit 583-233 at 36 seen acres is proposed in Alternatives F2, F4 and F6. This unit is immediately adjacent to the 1989-94 EIS units mentioned above combining for 182 seen acres, which would move the visual condition to a drastically altered condition, two levels below the VQO. The IDT proposed a non-clearcut harvest method for this unit, which would be based on site-specific design by a landscape architect and a silviculturist. This would not add appreciably to the heavily altered visual appearance.

Table 3-94 summarizes the effects of the alternatives on the Ratz Harbors viewshed. Both existing and cumulative Visual Disturbance (VD) are shown by seen acres and percent.

Table 3-94
Effects on Ratz Harbors Viewshed

	Summary of the Alternatives					
	1 & 1A*	F2	F3	F4	F5	F6
Viewshed Acres	5,369					
Existing VD-Acres	1,540 *					
Existing VD-Percent	29 *					
No. of Units Proposed	0	7	3	7	5	7
No. of Acres	0	233	23	205	139	233
Cumulative VD-Acres	1,540	1,773	1,563	1,745	1,679	1,773
Cumulative VD-Percent	29	33	29	32	31	33

SOURCE: Angelus 1993 * Alt 1A has 146 fewer acres and 3 percent less visually disturbed.

Clarence Strait at Sal Creek Viewshed

This 9,853-acre saltwater viewshed (the largest in the CPOW Project Area) in VCU's 579, 584, 585, and 586 is located south of the Ratz Harbors viewshed along Clarence Strait to Snug Anchorage. These valleys and their slopes are seen as middleground from the marine travel route. The landscape character of the northern portion (Little Ratz Harbor south to Narrow Point) is defined by a combination of 1,200- to

1,400-foot steep-sided slopes above an east-west oriented valley (Sal Creek), and a high adjoining ridge running north-south, paralleling the coast northwest of Narrow Point. The southern portion (Narrow Point south to Snug Anchorage) is comprised of northwest-to-southeast aligned 1,000- to 1,800-foot ridges and valleys with numerous knobs in between.

Existing Visual Condition. This viewshed appears as moderately altered from previous harvest that occurred in the mid-1960's. Twenty-one percent or 2,075 acres have been harvested since 1954, of which 3 percent was cut in the past 20 years. Although this regenerating forest is nearing 25–30 feet in height, recent harvest has taken place near the coastline on prominent knobs and ridges. However, this harvest has not contributed to a negative visual impact because it is, for the most part, obscured from view. Currently, this viewshed meets the proposed VQO of Modification.

Alternative 1 - After completion of 1989-94 EIS units

Just north of Sal Creek, along the coastline, there are six 1989-94 remaining uncut harvest units (276 seen acres). Three units—Unit 584-100 (18 acres), Unit 584-101 (24 acres) and Unit 584-122 (32 acres)—are immediately back of the beach fringe buffer. The other three units, Unit 584-119 (68 acres), Unit 584-120 (52 acres) and Unit 584-121 (82 acres) are located on the upper slopes inside No-Name Creek Canyon. This canyon is a very small, shallow and steep-walled valley where the proximity of these planned units may produce a dominant visual impact when harvested. There are no other units proposed in this no-action alternative. Assuming the completion of 1989-94 EIS units, the FVC would remain moderately altered, except for continuing changes in tree heights, color and textures.

Alternative 1a - Before completion of 1989-94 EIS units

No units are proposed in this alternative. Including the above mentioned 1989-94 EIS units left unharvested, the FVC would remain moderately altered, except for continuing change in tree height, color, and texture.

Alternatives F2 through F6

Alternative F2 proposes 13 units (361 seen acres) in this viewshed, while Alternative F4 proposes nine units (210 seen acres). There are two groupings of units that would have the most visual impact to the cruiseship or ferry viewer. The first grouping consists of Unit 584-218, Unit 584-226, and Unit 584-227, which are proposed at the upper end of Sal Creek on a south-facing slope and ridge. This grouping is proposed in Alternatives F2, F4, F5 and F6 and totals 115 seen acres. The second grouping is composed of Unit 584-220, Unit 584-220B, and Unit 584-263 totaling 83 seen acres, and is located on a low ridge facing northeast just above Narrow Point. This second grouping is proposed in Alternatives F2 and F3.

All other units in the five alternatives are scattered on ridges and knobs back of the Sandy Beach Picnic area and Snug Anchorage. These do not add additional visual impacts due to the visual diversity from the mosaic of old second-growth harvest areas and remaining old-growth stands. As proposed in all alternatives, all units would meet the VQO of Modification for this viewshed. The FVC would remain moderately altered except for continuing changes in tree heights, color and texture patterns.

Table 3-95 summarizes the effects of the alternatives on the Sal Creek viewshed. Both existing and cumulative Visual Disturbance (VD) are shown by seen acres and percent.

Table 3-95
Effects on Sal Creek Viewshed

	Summary of the Alternatives					
	1 & 1A*	F2	F3	F4	F5	F6
Viewshed Acres	9,853					
Existing VD-Acres	2,075 *					
Existing VD-Percent	21 *					
No. of Units Proposed	0	13	10	9	11	9
No. of Acres	0	361	236	210	290	283
Cumulative VD-Acres	2,075	2,436	2,311	2,285	2,365	2,358
Cumulative VD-Percent	20	25	23	23	24	24

SOURCE: Angelus 1993 * Alt 1A has 276 fewer acres and is 3 percent less disturbed.

'Viewsheds' are specific areas as seen from representative viewpoints such as hiking trails or saltwater.

Indirect Effects

Indirect effects are the result of an action occurring at a location other than where the action takes place and/or later in time, but in the reasonably foreseeable future. Indirect visual effects created by timber harvest activities include residual slash, cut and fill slopes of road grades, rockpits, landings, erosion, and windthrow.

* Visitor visual sensitivity to change will occur through increased use of previously inaccessible portions of the Project Area. All alternatives propose timber harvest in areas previously inaccessible to vehicles.

* In the Baird Peak area, alternatives F2, F3, F5 and F6 propose a string of units along the beach fringe buffer from both the north and the south, leaving just 1-1/2 miles to be connected in the future.

* In the Whale Pass area, alternatives F2, F3, F4, F5 and F6 propose entries from the north along the western shore of the Pass. New views of Thorne Island and those overlooking the downstream portions of Mabel Creek will be visible.

* In the Mabel Creek area, alternatives F2, F3 and F6 propose entries and new road access north of Sweetwater Lake; Alternative F6 also proposes road access to the southern shore of Whale Pass.

* In the Paul Young area south of Thorne Bay and west of Karta Bay, alternatives F3 and F4 propose entries and road access that will pass the Rush and Brown historic mining claim to the Creek itself. This access road may provide the closest trailhead to the Karta Bay Wilderness area boundary, just one-half mile to the south.

Summary of Direct and Indirect Effects

Introduction

The visual impact from development of any landscape is directly related to the distance from the viewer to the activity viewed. The West Coast Waterway Region is viewed generally from 1 to 2 miles offshore. The Whale–Harbor Region, primarily a river corridor and narrow saltwater passageway, is viewed generally from 1/8 mile to 1 mile. The Clarence Strait Region is viewed generally from 3 to 4 miles offshore.

The difference in viewing distance accounts for changes in an observer's sensitivity to landscape changes. Sights and sounds are amplified by the height and nearness to the observer of the activity being viewed. For example, one doesn't hear an echo in a canyon six miles wide, but one will easily hear an echo in a canyon with near vertical walls only one mile wide.

Consequently, indirect effects such as vegetative disruptions from windthrow along a back edge of a clearcut or visible mass wasting below a road cut also affects the observer's perception of the viewed landscape.

Summary of Direct Effects

Tables 3-96 through 3-98 displays impacts by alternative to the West Coast Waterway, Whale–Honker, and Clarence Strait regions respectively.

Table 3-96
West Coast Waterway Region: Summary of Effects by Alternative

	1,1a	F2	F3	F4	F5	F6
Area One Viewshed-Acres	21,333					
Existing VD-Acres	7,097					
Existing VD-Percent	33					
No. of Units Proposed	0	14	19	21	19	14
No. of Acres	0	386	454	553	511	440
Cumulative VD-Acres	7,097	7,483	7,551	7,650	7,608	7,537
Cumulative VD-Percent	33	35	35	36	36	35

SOURCE: Angelus 1993

Table 3-97
Whale–Honker Region: Summary of Effects by Alternative

	1,1a	F2	F3	F4	F5	F6
Area Two Viewshed-Acres	20,528					
Existing VD-Acres	2,019					
Existing VD-Percent	10					
No. of Units Proposed	0	10	15	10	8	10
No. of Acres	0	270	341	298	206	299
Cumulative VD-Acres	2,019	2,289	2,360	2,317	2,225	2,318
Cumulative VD-Percent	10	11	12	11	11	11

SOURCE: Angelus 1993

Table 3-98
Clarence Strait Region: Summary of Effects by Alternative

	1 & 1A *	F2	F3	F4	F5	F6
Area 3 Viewshed-Acres	22,638					
Existing VD-Acres	4,951 *					
Existing VD-Percent	22 *					
No. of Units Proposed	0	28	20	22	25	24
No. of Acres	0	914	597	630	794	863
Cumulative VD-Acres	4,951	5,865	5,548	5,581	5,745	5,814
Cumulative VD-Percent	22	26	25	25	25	26

SOURCE: Angelus 1993 * Alt 1a has 422 fewer acres and is 2 percent less disturbed.

The overall direct effects of the five proposed action alternatives on the 12 key viewsheds and included in the three regional areas just displayed are summarized in Table 3-99 below.

Table 3-99
Project Area Viewsheds: Summary of Effects by Alternative

	1, 1a*	F2	F3	F4	F5	F6
All CPOW Viewsheds-Ac.	64,499					
Existing VD-Acres	14,067 *					
Existing VD-Percent	22 *					
No. of Units Proposed	0	52	54	53	52	48
No. of Acres	0	1,570	1,392	1,481	1,511	1,602
Cumulative VD-Acres	14,067	15,637	15,459	15,548	15,578	15,669
Cumulative VD-Percent	22%	24%	24%	24%	24%	24%

SOURCE: Angelus 1993 * Alt 1a has 422 fewer acres and is 1 percent less disturbed.

As shown above, timber harvest proposed in any alternative with this EIS accounts for just two percent added visual disturbance to the Project Area as a whole.

Cumulative Effects

Cumulative effects on the visual resource may be defined as impact to a landscape's scenic quality that is the result of collective past, present and reasonably foreseeable future actions.

Reasonably Foreseeable

The potential for visual impact is greatest immediately following harvest, especially when clearcut silvicultural prescriptions are employed. In the foreground distance zone (up to 1/2 mile), stumps, slash and other debris are dominant. Results of harvesting and road construction are readily apparent, including cut-and-fill slopes, rock pits, and turnouts. As viewed in the middleground (1/2 mile to 4 miles), vivid distinction in texture, line and color of the mature forest and the harvest unit would be apparent. Exposed trunks and limbs of the new edges would dominate the visual setting.

In the first few years following harvest, there is an increase in color contrasts with adjacent mature stands, as the stumps and slash assume a silver hue due to weathering. By the fifth year of regeneration, the new forest would be filling out with low-lying vegetation (berry bushes, ferns, etc.). In the foreground, this green-up would begin to obscure stumps and cover the exposed soil. In the middleground, the harvest unit appears light green and of an even texture in contrast to the dark green hue and ragged texture of adjacent old-growth stands.

By age 8–10, the young trees reach a height of approximately five to six feet, and continue growing about one foot per year. Views created with the original clearcut would become limited. In the middleground, the contrasts between the new forest and mature forest would still be obvious.

Reasonably foreseeable effects can be estimated by cumulative visual disturbance resulting from the next series of entries into the individual viewsheds by the year

2004. The Timber section of this chapter estimated the amount of harvest within each VCU by the end of the Long-Term Contract in 2004. Alternative F5 (the preferred alternative) represents the proposed action and also provides an estimate of the percentage of visually disturbed acres resulting from harvest within a given viewshed.

Table 3-100 shows how the estimated 2004 acres of visual disturbance were calculated for each viewshed.

Table 3-100
Estimated Acres (2004) of Visual Disturbance for CPOW Viewsheds

Viewshed	VCU	(1) Next Entry This VCU	(2) Alt. F5 Entry This VCU	(3) Alt. F5 Visual Disturb.	2004 Visual Disturb.*
Shaheen Creek	587,589	906	988	58	53
Staney Creek	587,588	1,166	2,057	189	107
Kussan Point	571,587	739	1,025	183	132
Sarkar Cove	554,557	460	250	58	107
Sarheen Creek	549,550	705	355	23	46
Whale Passage	550,551 552,573	3,121	334	190	1,775
Barnes Lake	552,573	2,514	334	0	0
Sweetwater Lake	573,577	2,135	808	0	0
Hatchery Lake	573,574	2,265	490	15	69
Baird Peak	581,582	853	485	365	642
Ratz Harbor	583	568	448	134	176
Sal Creek	579,584 585,586	1,386	2,056	290	195

* (1) divided by (2) multiplied by (3).

Table 3-101 displays current, proposed (1996), and reasonably foreseeable (2004) visual disturbance by viewshed.

Table 3-101
Current, Proposed (1996) and Reasonably Foreseeable (2004) Visual Disturbance, by Viewshed

Viewshed	(1) Total Acres	(2) Current Visual Disturb. (Acres)	(3) 1996 Visual Disturb. (Acres)	(4) 2004 Visual Disturb. (Acres)	2004 Visual Disturb. (Percent)*
Shaheen Creek	6,769	1,277	58	53	21
Staney Creek	8,285	3,517	189	107	46
Kussan Point	1,782	927	183	132	70
Sarkar Cove	2,429	859	58	107	42
Sarheen Creek	2,068	517	23	46	28
Whale Passage	4,184	176	190	1,775	51
Barnes Lake	2,220	309	0	0	14
Sweetwater Lake	8,082	613	0	0	8
Hatchery Lake	6,042	921	15	69	17
Baird Peak	7,416	1,336	365	642	32
Ratz Harbor	5,369	1,540	139	176	35
Sal Creek	9,853	2,075	290	195	26

* (2) + (3) + (4)

These reasonably foreseeable cumulative estimates of visual disturbance represent one means of predicting the visual condition in existence by the end of the Long-Term Contract in 2004. The results indicate the amount of disturbance has the potential to exceed the TLMP Draft Revision Alt. P tolerance for visual disturbance in the following viewsheds: Kussan Point, Sarheen Creek, Whale Passage, Hatchery Lake, Baird Peak, Ratz Harbor, and Sal Creek.

There are a number of factors that may increase or reduce these predicted effects. *Reducing* factors include: (1) continued growth of older second-growth stands may change their status as 'disturbed' acres; (2) there may be increased use of non-clearcut harvest systems; (3) continued harvest may eliminate the edge effect as the landscape is changed from old-growth forest interspersed with clearcuts to a more homogenous landscape of second growth with some old-growth forest; (4) there may be a different distribution of a harvest among the viewsheds. The chief factor that may *increase* predicted effects is the difficulty to continue harvest in certain viewsheds while continuing to avoid seen areas. For example, the next entry preducts 2,135 acres of harvest in the VCU's containing the Sweetwater Lake viewshed, while predicting there will be zero visually disturbed acres. It may be difficult to continue to locate thse harvest units in screened locations.

Long-Term Effects

After 50 years, the new forest would reach a height of approximately 75 feet. In the foreground, views beyond the original unit are rare from the canopy closing. Little light is now reaching the forest floor, and understory vegetation is becoming scarce. In the middleground, the stand is more than one-half the size of the adjacent mature forest, providing a smoother transition at the harvest unit boundaries.

At 100 years, little visual difference would exist between the new plantation and adjacent mature forest. Timber would reach 100 feet or more and appear healthy, lush, and full canopied. Little light penetrates the canopy to reach the forest floor. In the decades that follow, dead snags will begin to litter the forest floor and create visual conditions typical of old growth. In the middleground, there would be little apparent difference between the old and new forest.

Assuming implementation of the Forest Plan through the year 2054 or through the first rotation, timber harvest would remove or alter almost 100 percent of the remaining suitable-available timber in the Project Area's viewsheds.

In areas where commodity production is the focus, such as those lands proposed with this EIS as Timber Production LUD, the normal period of rotation is considered 100 years or until the year 2054. In the more restrictive LUD's, such as Modified Landscape or Scenic Viewshed, the rotation period lengthens to approximately 120- to 200-year periods respectively. It is important to understand that all visible suitable-available lands will be harvested over time. During this time Prince of Wales Island, in particular the CPOW Project Area, will be in a continual state of obvious visual change with a mosaic of varying heights, colors, and textures predominating, the appearance of which would be as described above.

RECREATION

Key Terms

Recreation Opportunity Spectrum (ROS) - land delineations that identify a variety of recreation experience opportunities, categorized into six classes ranging from primitive to urban
Recreation Places - identified geographical areas having one or more physical characteristics that are particularly attractive to people engaging in recreation activities (e.g., beaches, trails, cabins, campgrounds)
Roadless Area - an area of undeveloped public land within which there are no improved roads maintained for travel by means of motorized vehicles intended for highway use
Wild & Scenic River - rivers or sections of rivers designated by congressional action under the 1968 Wild and Scenic Rivers Act or by an act of the Legislature of the state of states through which they flow; may be classified or administered as wild, scenic, or recreational
Wilderness - areas designated by congressional action under the 1964 Wilderness Act or by TTRA and/or ANILCA; undeveloped federal land retaining its primeval character and influence without permanent improvements or human habitation

Affected Environment

The Tongass National Forest possesses a combination of features, including inland waterways with extensive miles of shoreline, mountains, fjords, glaciers, and populations of wildlife and fish that provide opportunities for a wide range of recreational experiences. Prince of Wales Island contains many of these features, and is unique in that recreational opportunities are more accessible by road than elsewhere in Southeast Alaska.

Past timber management activities on Prince of Wales have resulted in an extensive road system, with over 1,450 miles of road (517 within the Project Area) providing a variety of recreation opportunities which are virtually unavailable in other parts of the Tongass. The combination of roaded recreation, alpine muskegs, saltwater bays and sheltered travel corridors, interior lakes, and rivers serves to provide a large spectrum of recreation opportunities. The Alaska Marine Highway Ferry System and various air carriers make these opportunities readily available to residents of and visitors to Southeast Alaska.

Recreation Opportunity Spectrum

Recreation opportunities in the Central Prince of Wales (CPOW) Project Area have been inventoried using the Recreation Opportunity Spectrum (ROS). The ROS system portrays a range of recreation activities, settings, and experiences from primitive to urban. Opportunities in the various classes depend on a variety of factors, including: access, facilities present, amount of modification to the natural environment, and the opportunity for isolation, risk, or self reliance. A summary of the existing acreages by ROS class is displayed in Table 3-102. The CPOW Project Area currently provides approximately 62 percent of acreage in the Roaded Modified ROS class.

Table 3-102
Existing Acreages in CPOW by Recreation Opportunity Spectrum (ROS) Class

ROS Class	Acres	% of total
Primitive (P1 and P2)	340	<1
Semi-Primitive Non-Motorized	92,302	29
Semi-Primitive Motorized	17,315	5
Roaded Natural	6,917	2
Roaded Modified	197,877	62
Rural	2,688	1
Total	321,866	100

Recreation Demand

Recreation use on Prince of Wales Island has increased steadily in the past few years. This increase in use is associated with increased access provided by the expanding road system. Articles on these roaded opportunities have appeared in national and local publications, further increasing awareness and use. In addition, over the past couple of years local travel agents and air charter services have expanded their promotion of recreation opportunities on Prince of Wales, both roaded and remote. Various package deals combining air sevice to the island and resort accommodations are frequently being advertised. Therefore, this increasing use includes not only recreational vehicles, but also air charter services flying customers into one of the Forest Service cabins or the private resorts scattered in and around the CPOW Project Area. The Project Area itself is only about an hour and a half drive from the Alaska Marine Highway ferry terminal at Hollis.

In response to this increasing trend, recreation maps and facilities have recently been developed. Additional facilities are being considered, such as viewpoints, campgrounds, trails and interpretive sites. A recreation planning effort is ongoing for the Thorne Bay District to assist in identifying facilities and their locations. Recreation use of Prince of Wales Island is expected to continue to increase, limited at this time in part by the capacity and schedule of the ferry system.

Various studies and surveys indicate that the preference for roaded recreation opportunities versus more primitive, remote opportunities, depends on what area or community is covered by the study.

Naturalness and remoteness associated with marine and freshwater recreation places were rated as "very important" by 80–90 percent of the recreation users survey throughout the Tongass National Forest. When asked about sensitivity to change,

Recreation Opportunity Spectrum (ROS)

Primitive (P) : provides opportunities for a high degree of interaction with the natural environment

Semi-Primitive Nonmotorized (SPNM): provides limited opportunities for isolation from humans

Semi-Primitive Motorized (SPM): predominantly unmodified natural environment with minimum evidence of humans

Roaded Natural (RN): predominantly natural environments with moderate evidence of humans

Roaded Modified (RM): a natural environment that has been substantially modified with evidence of roads

Rural (R) : a natural environment substantially modified by structures or vegetative manipulation

natural-appearing settings and solitude are the most important attributes (Clark and Johnson 1981). The most recent information available on the recreation use and preferences of local residents is the Alaska Public Survey (1979). According to this survey, Southeast Alaska residents highly value opportunities for remote, uncrowded outdoor recreation. A number of Alaska residents indicate that they would stop going to their favorite places if development-related activities occurred on the site.

For Southeast Alaska as a whole, the TLMP Draft Revision (1991a) provides projections on future demand and supply of recreation opportunities in terms of ROS classes. Semi-primitive motorized ROS settings and activities popular in these settings, represent the highest current use and the fastest projected growth. Primitive and semi-primitive nonmotorized settings are the second most popular and have the second highest projected increases in demand. Roaded settings have the lowest level of use currently but are also expected to show increases in demand.

In fact, according to the 1979 Alaska Public Survey, the most significant barrier to participating in recreation activities was insufficient places accessible from communities. Access was especially important to those wanting to do more hunting, fishing and beachcombing. Many Prince of Wales recreationists are there to experience the roaded recreation experiences such as fishing and hunting that are unique to that island. This is apparent from an unpublished survey of Prince of Wales Island residents made in 1992. This survey is part of document called "Priority List of Recreation Development Projects for Prince of Wales and Associated Islands." The survey asked residents to express their thoughts on priorities for future recreation development on the Island. Their responses indicated a strong interest in more recreation development associated with the road system. Highest support was given to developments such as a campground in the Maybeso Creek/Harris River area, expansion of the facilities at Eagle's Nest Campground and more trails off the road system. Surveys of Ketchikan residents have also indicated a desire for more roaded recreation opportunities, particularly for more hiking opportunities accessible from the road system.

There has also been increasing interest in the cave resources on Prince of Wales and in the Forest Service's plans to create limited access to some of the caves near the road system.

While roaded opportunities are in great demand among Prince of Wales and Ketchikan residents, there is also a desire for the more remote recreation settings among large segments of these populations as well. This is indicated by comments to the draft of this EIS and other planning documents, including the Forest Plan (TLMP) Draft Revision.

Nonresident recreation or tourism is highly dependent on meeting customer expectations, which include "seeing and experiencing vast, awe-inspiring, untamed land and its wildlife" (TLMP Draft Revision 1991a). At the same time, visitors often lack the knowledge, ability, or equipment to safely enjoy many activities in Southeast Alaska. Attractions must be available and promoted, often through the services of outfitters and guides, and resorts to continue to provide opportunities for visitors (McDowell and Eppenbach 1985).

There are several aspects of tourism on Prince of Wales that indicate a demand for the type of recreation attractions and settings on the island. The public scoping for another NEPA project, which analyzes future locations for outfitter guide operations, indicates that several outfitters on Prince of Wales desire to take clients

to road accessible fish streams such as Staney Creek, the Thorne River and others. Furthermore, they are indicating that crowding is beginning to occur at several of these streams. Hence, they would like to see easier access to some other stream systems to relieve pressure on the presently used popular systems. The environmental assessment mentioned above will consider these factors in analyzing the effects of permitting outfitter and guide operations in various areas.

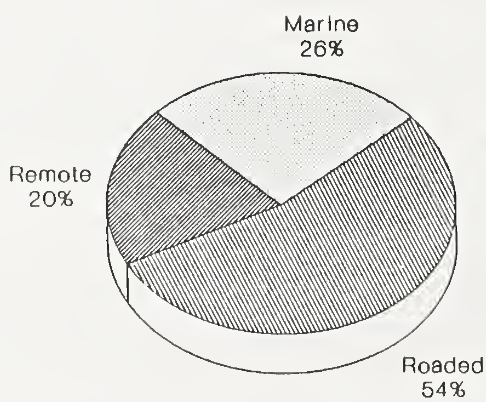
Two resorts have also opened in the past few years within or on the edge of the Project Area—the El Capitan Lodge in Sarkar Cove, and the Whales Resort just south of the community of Whale Pass. Both have been established in areas of the island that have been heavily altered by timber harvest. However, the immediate setting around these resorts is only moderately altered in the case of the Whales Resort and still in a natural condition immediately around El Capitan Lodge. A smaller scale family-style fishing resort has been in operation for several years in Thorne Bay.

Recreation Places

A Recreation Place is identified as a geographic area having one or more physical characteristics attractive to people engaging in recreation activities. These places may be beaches, streams, trail corridors, alpine meadows, cabins, lakes, campgrounds, picnic areas, or anchorages. Each Recreation Place has some activity associated with it such as hiking, camping, hunting, canoeing, or viewing scenery or wildlife. They are defined not just by the specific site, but by the geographic area that is important to the present ROS setting around the site.

There are 60 Recreation Places identified within the Project Area. Figure 3-37 (pie chart) shows the percentage of POW Recreation Places accessed by remote, marine, and roaded methods. Figure 3-38 (map) and Table 3-103 display the Recreation Places within the Project Area, some of the features associated with the place, the ROS class, and the access method for each.

Figure 3-37
Access to Recreation Places



Gold and Galligan backwaters provide opportunities for semi-primitive canoeing, kayaking, and boating.

Wild and Scenic Rivers

The Wild and Scenic Rivers Act of 1968 provides a means for recognizing and protecting the free-flowing character and the outstandingly remarkable scenic, recreation, geologic, fish and wildlife, historic, cultural, ecological, and other values of selected rivers. The Thorne River–Hatchery Creek river system is the only watercourse in the CPOW Project Area eligible for inclusion in the Wild and Scenic River system. No harvest units are proposed within the eligible river corridor.

The Sarkar Lakes drainage has also been determined to be eligible for the Wild and Scenic River System, and is completely surrounded by the CPOW Project Area. Sarkar Lakes, however, is excluded from the Project Area, and no harvest units are proposed within the eligible river corridor. The TLMP Draft Revision (1991a) has designated this area to be managed for primitive recreation.

Eligible rivers are classified into three categories:

> *Wild Rivers* - Those rivers or sections of rivers that are free of impoundments and generally inaccessible except by trail, with watersheds or shorelines essentially primitive and waters unpolluted.

Figure 3-38
Map of Recreation Places in CPOW Project Area

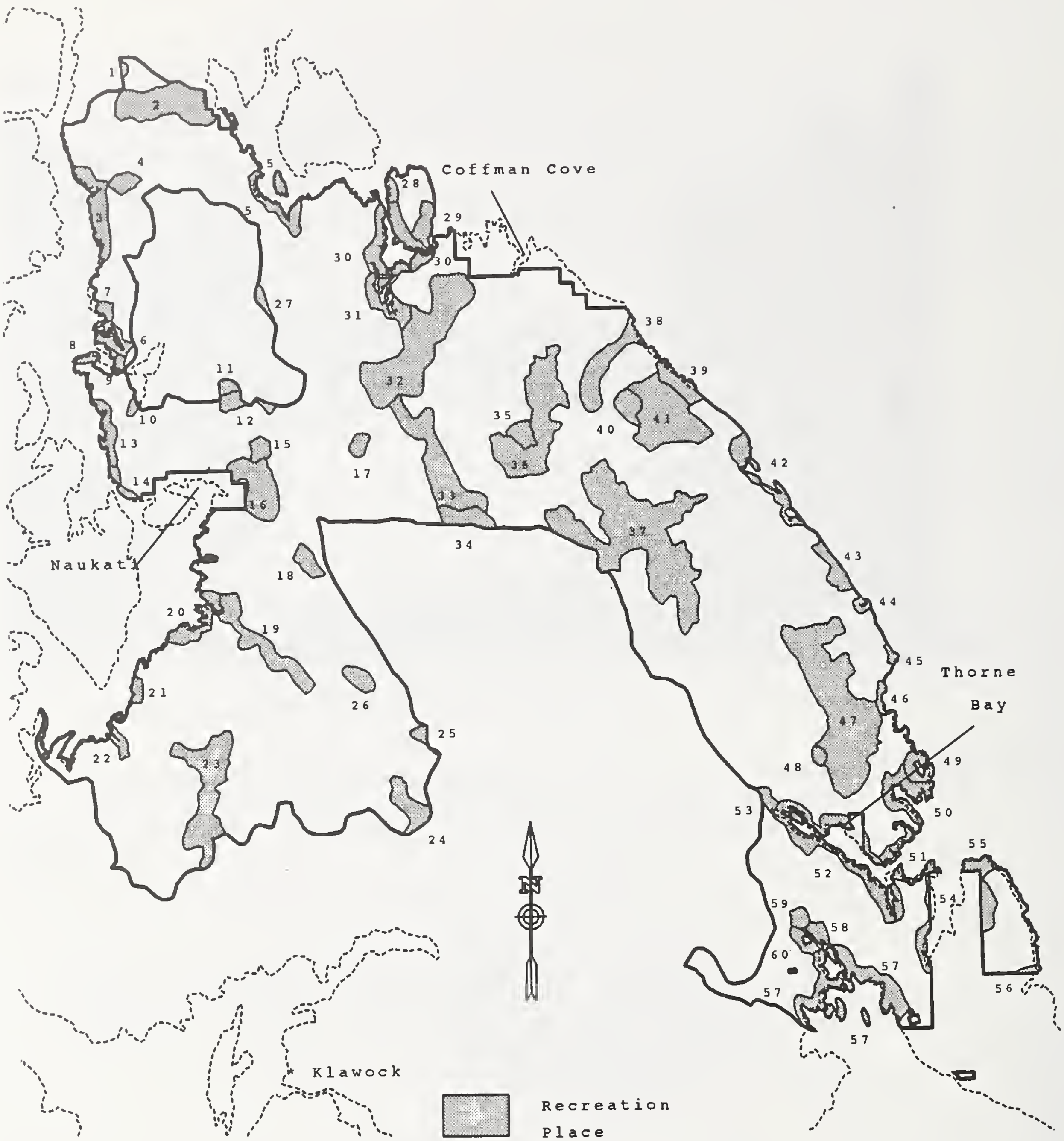


Table 3-103
Recreation Places in the CPOW Project Area

No.	Recreation Place	Features	Acres	ROS*	Access/Status*
1.	View Point, Road #20	Viewing, Dispersed Picnic	85	RM	Roaded/DIS
2.	Neck Lake	Boat Ramp, Hiking	2,756	RM	Roaded/P
3.	Sarheen Cove	Anchorage, Shoreline	1,419	SPM	Marine/DIS
4.	Sarheen Cove, #20	Scenery, Wildlife	461	RN	Roaded/DIS
5.	Whale Pass	Anchorage, Shoreline	1,004	SPM	Marine/DIS
6.	Salt Water Lagoon	Boating, Beach	496	RM	Roaded/DIS
7.	Clam Cove	Beachcombing, Boating, Camping	252	RM/SPM	Roaded/P
8.	Sarkar Cove	Anchorages, Fishing, Beach	224	SPM	Marine/P
9.	Sarkar Creek	Hiking, Beach	127	RN	Roaded/DIS
10.	Sarkar Lake Access	Cabin, Canoe/Kayaking	129	RM	Roaded/D, DIS
11.	Upper Yatuk Creek	Canoe/Kayaking	212	SPNM	Roaded/DIS
12	Yatuk Creek	Camping	482	RM	Roaded/DIS
13.	Kassan Island	Boating, Canoe/Kayaking	669	SPM	Roaded/DIS
14.	Tuxekan Narrows	Anchorage, Boating	251	RM	Marine/DIS
15.	Naukati Lake Access	Picnic, Canoe/Kayaking	388	RM	Roaded/DIS
16.	Naukati Lake	Scenic, Hiking/Canoe/Kayak	1,896	SPNM	Roaded/DIS
17.	Log Jam Creek	Fishing	334	RM	Roaded/DIS
18.	#20 Road Viewing Area	Scenic, Wildlife Viewing	519	RM	Roaded/DIS
19.	Staney Creek	Cabin, Trail, Campsites	1,921	RM	Roaded/D, DIS
20.	Chusini Cove	Beach, Hiking, Fishing, Canoe	969	RM	Marine/DIS
21.	Winter Harbor	Boating, Canoe/Kayaking	241	RM	Marine/P, DIS
22.	Shaheen Creek	Fishing	306	RM	Roaded/DIS
23.	Kogish Mountain	Hunting	3,329	SPNM	Roaded/DIS
24.	Upper Staney Creek	Hunting	978	SPNM	Roaded/DIS
25.	Thorne Mountains	Hiking, Hunting	231	SPNM	Roaded/DIS, P
26.	Staney Meadows	Scenic, Viewing	520	RM	Roaded/DIS
27.	Mable Creek	Viewing, Canoe/Kayaking	218	P	Remote/DIS
28.	Mouth of Indian Crk.	Anchorages, Boat, Canoe/Kay	239	SPM	Marine/DIS
29.	Lake Bay	Boating, Canoe/Kayaking	603	SPM	Marine/DIS
30.	Barnes Lake	Cabin, Hunting, Scenery, Canoe	1,922	SPM	Marine/D, DIS
31.	Gold and Galligan	Boating, Canoe/Kayaking	1,033	SPNM	Marine/DIS
32.	Sweetwater Lake	Cabin, Fishing, Hunting	5,533	RM	Roaded/D, DIS
33.	Hatchery Lake	Canoe, Fishing, Camping	3,065	RM	Roaded/DIS
34.	Butterfly Lake	Canoe, Camping, Fishing	826	SPNM	Remote/DIS
35.	Trumpter Lake	Hiking, Hunting	498	RM	Roaded/DIS
36.	Trumpter Alpine	Hiking, Hunting	4,095	SPNM	Remote/DIS
37.	Manty Mountain	Hiking, Hunting	9,429	SPNM	Remote/DIS
38.	Luck Lake	Picnic, Fishing, Beach	1,619	RM	Both/D, P
39.	Clarence Strait	Beach, Dispersed Camping	745	SPM	Marine/DIS
40.	North Baird	Hiking, Hunting	622	RM	Roaded/DIS
41.	Baird Peak	Hiking, Hunting	3,393	SPNM	Roaded/DIS
42.	Ratz Harbor	Anchorages, Beach, Picnic	1,110	RM	Marine/P, DIS
43.	Short Beach	Beach, Picnic, Camping	681	RN	Marine/DIS, P
44.	Sal Creek	Beach, Fishing, Viewing	174	RN	Marine/DIS, P
45.	Narrow Point	Beach, Fishing, Picnic	123	RN	Roaded/DIS
46.	Sandy Beach	Picnic Ground, Beach, Fishing	213	RN	Roaded/D
47.	Slide Creek	Hunting	7,483	RM	Roaded/DIS
48.	Boy Scout Lake	Organization Camp, Hunting	214	RM	Roaded/DIS
49.	Forss Cove	Anchorage, Boating, Viewing	573	SPM	Marine/P, DIS
50.	Snug Anchorage	Anchorage, Boating, Viewing	1,171	SPM	Marine/P, DIS
51.	Thorne Head	Boating	485	RM	Marine/P, DIS
52.	Thorne Bay	Anchorage, Interp., Boating	2,721	R	Roaded/P, DIS
53.	Lower Thorne River	Campground, Fishing	254	RN	Roaded/D, DIS
54.	Tolstoi Bay	Boating, Fishing	1,157	RN	Marine/DIS
55.	Tolstoi Point	Hunting, Fishing	375	SPM	Marine/DIS
56.	Windfall Harbor	Boating	123	SPM	Marine/DIS
57.	North Karta Bay	Boating, Beach, Fishing	2,780	SPM	Marine/DIS, P
58.	Salt Chuck	Hiking, Hunting	375	RM	Roaded/D, DIS, P
59.	Lake #3	Camping, Hiking, Hunting	311	RM	Roaded/D
60.	Lake Ellen	Hiking	354	SPNM	Roaded/DIS

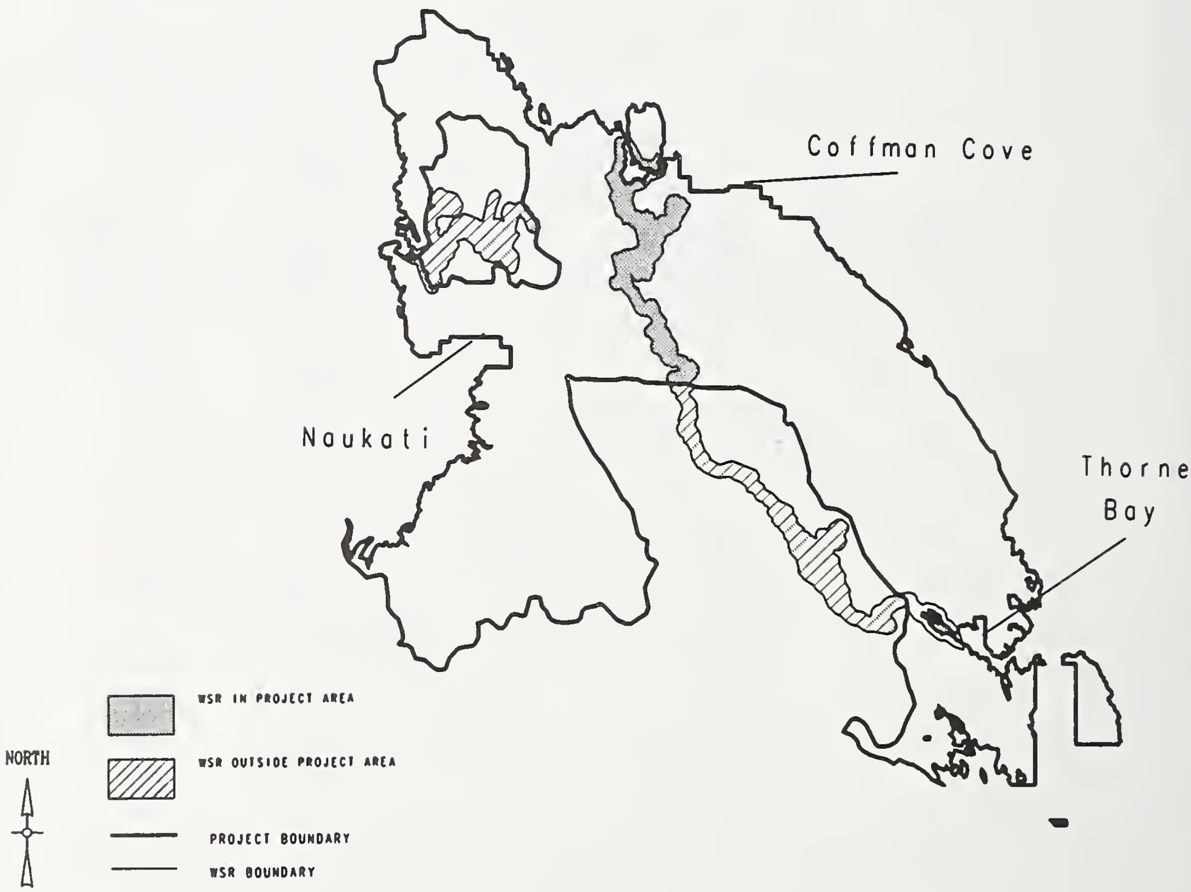
*KEY: RM=Roaded Modified SPM=Semi-Primitive Motorized RN=Roaded Natural SPNM=Semi-Primitive NonMotorized P=Primitive R=Rural; D=existing developed use DIS=dispersed use P=potential developed use

Scenic Rivers - Those rivers or sections of rivers that are free of impoundments, with shorelines or watersheds still largely primitive and shorelines undeveloped, but accessible in places by roads.

Recreational River - Those rivers or sections of rivers that are readily accessible by road or railroad, that may have some development along their shorelines, and that may have undergone some impoundment or diversion in the past.

Thorne River and Hatchery Creek are eligible for inclusion in the Wild and Scenic River System because of the outstandingly remarkable fisheries, wildlife, recreation and scenic values they possess. Alternative P of the TLMP Draft Revision identifies 42 miles of the Thorne River–Hatchery Creek system as suitable for recommendation as a Scenic/Recreation River. The CPOW Project Area includes a large portion of the river within the recreational classification and a portion of the river meeting the scenic classification. Developed recreation facilities and timber management are acceptable within a river classified as recreational. Some developed recreation facilities and limited timber management could occur within a river classified as scenic, provided that the modifications are screened from view of the river and there are no adverse effects on the outstandingly remarkable values (FSH 1909.12, Chapter 8). Figure 3-39 shows the portions of the Thorne River–Hatchery Creek system within the Project Area being considered for recommendation in the Wild and Scenic River system.

Figure 3-39
Scenic/Recreation River Corridors in or Near CPOW



Wilderness

The National Wilderness Preservation Act of 1964 mandated that designated "wilderness areas...shall be administered for the use and enjoyment of the American people in such a manner as will leave them unimpaired for future use and enjoyment as wilderness, and so as to provide for the protection of these areas, the preservation of their wilderness character, and for the gathering and dissemination of information regarding their use and enjoyment as wilderness." In 1990, the Tongass Timber Reform Act (TTRA) amended ANILCA and designated five new wildernesses, including the Karta, and an addition to an existing wilderness.

The Karta Wilderness on Prince of Wales Island, established by TTRA, is the nearest wilderness area to the CPOW Project Area. This 39,984-acre area includes the drainage of the Karta River system at the head of Kasaan Bay, about five miles from the communities of Kasaan and Hollis. The Karta River area contains high value fish habitat for coho salmon. The two major lakes, Salmon Lake and Karta Lake, are important spawning sites for sockeye salmon. Recreation use of the Forest Service cabin is high, while the subsistence importance for sockeye salmon is documented in the Subsistence section of this chapter.

The Southeast boundary of the CPOW Project Area is adjacent to the Karta Wilderness. The nearest planned units are approximately 3,000 feet from the Wilderness area boundary (See Figure 1-1, Chapter 1.)

Roadless Areas

This section identifies the roadless areas in the Project Area which meet the minimum criteria for potential inclusion in the National Wilderness System. Roadless areas identified in the inventory as presented in the TLMP Draft Revision (1991a) may be considered for wilderness recommendation or may be managed for a wide range of other resource management activities. Once an area is roaded it is generally no longer available for wilderness consideration. Depending on when and how the activity was conducted, evidence of previous timber harvest, abandoned habitations, and historic mining may not necessarily result in an irreversible removal of land from future wilderness consideration.

To qualify as roadless, an area must contain at least 5,000 acres of undeveloped land which does not contain improved roads maintained for travel by passenger-type vehicles. However, areas less than 5,000 acres may qualify if they constitute a self-contained ecosystem such as an island, are contiguous to existing wilderness, or are ecologically isolated by topography and manageable in a natural condition.

Roadless areas may retain their roadless character by being managed for emphases which require relatively large, undeveloped or natural areas, such as are usually required for old-growth habitat, scenic backdrops, or primitive recreation.

Five inventoried roadless areas identified in the TLMP Draft Revision (1991a) are located within the CPOW Project Area, and are shown in Figure 3-1, in the Old Growth and Biodiversity section of this chapter. Table 3-104 shows the size of these roadless areas and the portion that lies within the CPOW Project Area.

Table 3-104
Inventoried Roadless Areas within the CPOW Project Area

Roadless Area	Total size (acres)	Portion within CPOW (acres)
Kogish	72,261	16,665
Karta	63,336	5,364
Thorne River	91,530	33,227
Ratz	6,586	6,586
Sarkar	65,075	33,508

Kogish (Roadless Area 509). Extensive timber harvest has occurred on the north and west sides of this roadless area, while Native lands to the east have been been extensively logged. The more scenic areas are concentrated around the relatively rugged and diverse terrain of Kogish Mountain and Staney Cone, and the intricate shorelines and island groups in Salt Lake Bay and Nossuk Bay. The only known use by local residents is for occasional hunting.

Though roading and logging is evident on the perimeter, the natural integrity of this area is very good. Because of its difficult access, there is excellent opportunity for solitude, except for logging sights and sounds near the boundaries. The fishing and solitude along the streams in the southwestern portion of the area are an attraction. Most recreation attractions are associated with the saltwater bays, anchorages, and channels on the west side, where the experience level is primarily semi-primitive motorized.

The area contains 22,642 acres of available suitable forest land. The 1989-94 Operating Period EIS for the KPC Long-term Contract (LTS EIS) approved the harvest of 2,026 acres near Kogish Mountain, Staney Cone, upper Staney Creek, and Shaheen Creek, affecting the character of about 10 percent of the roadless area. The geology of the area indicates some potential for discovery of valuable minerals. The rugged terrain and difficult access limit the area's recreation potential, although the western and southern boundaries have potential for shelter sites and boat anchorages for small boats and kayaks.

Karta (Roadless Area 510). Salmon Lake, Karta Lake, and the Karta River form the principle water systems within this roadless area. The area is accessible by water at Kasaan Bay and by road on the north, west and south sides. There are known prehistoric village sites, rock art and other evidence of cultural history. The area receives substantial recreation and subsistence use. There are five recreation use cabins and eight miles of trail within the roadless area.

The natural integrity of the area is very good. The Karta River drainage is so popular during the summer months that there is limited opportuntity for solitude. Heavy cabin use, floatplane traffic, and trail use contribute to high probabilty of encountering other parties during the summer. The alpine ridges that rim the Karta River Drainage provide more opportunity for solitude. Extensive timber harvest along the periphery of this roadless area cause the edges to fall within the roaded modified or semi-primitive motorized opportunity classes.

The 1990 Tongass Timber Reform Act designated 39,894 acres of the Karta River area as Wilderness. A portion of this roadless area is also within the Maybeso Experimental Forest.

Access to the interior of the Thorne River Roadless Area is by floatplane.

Thorne River (Roadless Area 511). This roadless area includes a large part of the interior of Prince of Wales Island and almost all of the Thorne River drainage. Access to the interior is by floatplane or canoe for skilled boaters only. Notable features include the area around Snakey Lakes, an intricate complex of narrow, winding freshwater bodies north of the main Thorne River drainage, and the many areas of grassy meadows and large stands of spruce in portions of the Thorne River. One recreation use cabin is located at Honker Lake. The trail/canoe system within the area is frequently used. The area receives significant local use for subsistence and recreation activities.

Very good opportunities for solitude exist within the area, excluding the fringe where the sights and sounds of logging and traffic may be evident. The interior offers outstanding opportunities for primitive recreation, particularly canoeing and fishing.

The area contains 40,183 acres of available suitable forest land. The 1989-94 LTS EIS approved the harvest of 5,135 currently unroaded acres in the vicinity of the North Thorne River and Slide Creek. Under the TLMP Draft Revision, management for the Thorne River, Honker Divide, and Snakey Lakes area is for a combination of Scenic River, Scenic Viewshed, and Modified Landscape. This roadless area has outstanding fish habitat. Approximately 42 miles of the Thorne River and Hatchery Creek are eligible for inclusion in the Wild and Scenic River System and a suitability study is underway.

Ratz (Roadless Area 512). This area is characterized by very rugged terrain, including a well defined ridge and uplands west of Ratz Harbor, featuring flat wetlands and muskeg. The entire area is bounded by roads and timber harvest units, or by saltwater. The major scenic features are the diverse alpine terrain and small lakes near the summit of Baird Peak. The area receives light use by local residents for recreation and subsistence.

About half the area has been unaltered by human activity; the rest is moderately to heavily altered visually because of extensive timber harvest around the periphery. The area does have good natural integrity, and except during logging season, the opportunity for solitude is good. Potential for primitive recreation experiences is limited.

The area contains 2,884 acres of available suitable forest land, and the area is within the primary sale area for the KPC Long-term Contract. The area is important as unaltered wildlife habitat adjacent to extensive timber harvest areas. There is relatively low potential for recreation development.

Sarkar (Roadless Area 514). This roadless area, located on the north end of Prince of Wales Island, is bounded on three sides by extensive roaded and logged areas. The area contains known prehistoric, historic and traditional use Native sites. There are three recreation use cabins and an associated trail. The Sarkar Lake chain has a long history of subsistence and recreation use and these uses continue today.

The natural integrity of the area is good and most of the area has remained unaltered by human activity. There is very good opportunity for solitude, except for the sights

and sounds of logging along the fringes. The remoteness of the area, lack of human modifications and low probability of encountering others contribute in providing an excellent primitive recreation setting for activities such as canoeing, fishing and camping.

The area contains 26,943 acres of commercial forest land, though only a portion has been determined to be suitable available because of the large number of lakes, streams and riparian areas, and because the timber is located in small dispersed stands. This area was considered for wilderness designation in the 1990 Tongass Timber Reform Act but was not included. The TLMP Draft Revision designated this area to be managed for Primitive Recreation, Scenic River, Timber Production, and Modified Landscape. The area has high potential for developed and dispersed recreation, including trail construction, canoe portages in the Sarkar Lakes area, and additional recreation use cabins.

Effects of the Alternatives

Under all alternatives, the CPOW Project Area will continue to provide a wide range of recreation opportunities, including a variety of recreation activities, settings, and experiences. However, the roaded settings will be clearly dominant in this Project Area with the exception of a few saltwater areas and large alpine areas. All action alternatives generally result in a relatively small increase in the amount of the roaded settings and a decrease in the amount of semi-primitive settings. However, in a few specific areas some alternatives do create some significant changes to the recreation setting, which are described later. Methods used to evaluate the effects of the alternatives include: changes in the Recreation Opportunity Spectrum (ROS), harvest in currently important recreation places and roadless areas, and effects on Wild and Scenic River eligibilities and adjacent wildernesses.

The principal method used for analyzing the environmental consequences in the CPOW Project Area is based on this desire or expectation of forest visitors for specific types of experiences and settings. These settings and experience opportunities can be described using the Recreation Opportunity Spectrum (ROS). The effects on the recreational resource can be assessed by analyzing the change in the acres of each ROS class that would result under the alternatives. A change in ROS class resulting from the proposed actions in any alternative would reflect a change in the recreation opportunities available.

Direct and Indirect Effects

Recreation Opportunity Spectrum (ROS)

The distribution of Recreation Opportunities on POW is currently split between the motorized (51 percent) and nonmotorized (49 percent) categories. But Prince of Wales island is renowned in the region especially for the roaded recreation opportunities that are available. The CPOW Project Area, located in the heart of the island, has a high amount of motorized opportunities due to extensive roaded access from previous timber harvesting activities.

Presently in the CPOW area, what unroaded settings remain are almost all in a semi-primitive motorized or non-motorized class. Each of the proposed action alternatives for the Project Area will further shift acres from the semi-primitive class into the roaded modified class. Shifts from one opportunity class to another in small acre parcels will not individually have much of an effect on the recreation resources. However, large acreage shifts from the nonmotorized end of the spectrum to the motorized end of the spectrum will potentially limit opportunities for solitude and activities associated with unmodified settings.

Projected changes in the available opportunity classes resulting from implementation of the alternatives are illustrated in Table 3-105. A reduction of SPNM acres and an increase in RM recreation opportunities will occur in each action alternative. Users seeking experiences currently found in the SPNM will either tolerate the change in setting and the associated experience or they will be displaced to other parts of the Forest. Those seeking roaded access and a more modified environment will find more opportunities available to them as created by the harvest activities.

Table 3-105
Estimated Recreation Opportunity Spectrum (ROS), by Alternative, in Percent of Acres

ROS Class	Alt.1	Alt.1a	Alt.2	Alt.3	Alt.4	Alt.5	Alt.F6
Semi-Prim Non-Mot	29	30	24	25	24	23	24
Semi-Prim Mot	6	6	5	4	5	5	5
Roaded Natural	2	2	2	2	2	2	2
Roaded Modified	62	61	68	68	68	69	68
Rural	1	1	1	1	1	1	1

Large blocks of SPNM acres occur in the following areas: 1) Trumpter Lake, 2) Baird Peak, 3) Manty Mountain–Slide Creek, 4) Paul Young Creek, 5) Kogish Mountain, and 6) Barnes Lake–Whale Pass–Mabel Creek. These six areas represent the bulk of the acres remaining in the SPNM class. Comprised primarily of high alpine meadows or rugged backcountry, these areas are used for hunting, hiking, fishing, and other forms of undeveloped recreation. A closer look at how each alternative affects these six areas will indicate the broad changes in the ROS for the Project Area. The Sarkar Lakes area is also a large recreation area classified as either Primitive or Semi-primitive Non-motorized. It is surrounded by the CPOW Project Area but is not part of the area. Impacts to the Sarkar system are also discussed in this section. Site-specific recreation place impacts will be discussed later in this section.

Alternative 1. Under the no-action alternative there would be no new timber harvest and no additional new road construction. The six SPNM areas would retain their attraction for those individuals seeking undeveloped recreation, but would provide no additional recreation opportunites for those seeking roaded access.

Alternative 1a. Under the no-action/no-harvest alternative, harvest operations would cease for uncompleted 1989-94 harvest units. This would increase the SPNM portions of Baird Peak and Kogish Mountain. Recreation opportunities would decrease for users seeking roaded access into these areas.

Alternative F2. Under this alternative small portions of the Trumpeter Lake, Baird Peak, Manty Mountain, and Kogish Mountain areas would change from a SPNM class to a roaded modified class. Harvest activities in these four areas are located on the periphery causing the small adjustment in the SPNM acres.

The Paul Young Creek would not be affected by any new harvest. The Barnes Lake–Whale Pass–Mabel Creek area would be affected by 14 harvest units and associated new road construction. This area is currently a large contiguous block of unroaded acreage adjacent to the Sarkar Management Area. A large portion of this SPNM area would shift to RM which would in turn affect the Sarkar Lakes Area. Portions of the Sarkar Lakes Area would shift from primitive to SPNM. One proposed cutting units (553-222) is adjacent to the Sarkar Management Area and will require establishment of this LUD II boundary prior to layout. Though the harvest unit is not visible from the Sarkar Lakes area, the remoteness of this portion of Sarkar Lakes would be somewhat less depending on the future management of the roads in the area. The road could also serve as an additional trailhead into the east side of Sarkar area.

Roaded access into certain areas has the potential to provide additional fishing opportunities.

Alternative F2 would result in a shift of approximately 19,000 acres from SPNM or SPM to RM throughout the Project Area.

Alternative F3. A small portion of the Kogish Mountain and Manty Mountain areas would change from SPNM to RM due to two units and one unit respectively planned on the edges of these two areas. No changes will occur in the Baird Peak and Trumpeter Lake alpine areas.

The lower portions of Paul Young Creek would change from SPNM to RM due to two units in this drainage. Roaded access into this area has the potential to provide additional fishing opportunities. It also has the potential to provide roaded access to the Karta Wilderness Area. The gentle terrain in this area would be conducive to easy linkage with the Karta River Trail. This improved access could result in increased use of the Wilderness Area.

The road providing access to harvest units in the Paul Young Creek area would be gated and closed to all motorized vehicles following completion of harvest activities. This closure would remain in effect until the Karta Wilderness Implementation Schedule (WIS) determines the appropriate access for this area. (See the Transportation and Facilities section of this chapter.)

Alternative F3 proposes about over 30 cutting units throughout the Barnes Lake–Whale Pass–Mabel Creek area. The area between Barnes Lake and the Mabel Creek drainage and south of Whale Pass would change from SPNM to RM. Most of the Mabel Creek drainage would remain in a semi-primitive setting.

No harvest units in this alternative are located near the Sarkar Lakes LUD II boundary that would affect the remoteness or solitude of this area.

Alternative F3 results in a potential shift of approximately 15,800 acres from SPNM or SPM to RM throughout the project area.

Alternative F4. Trumpter Lake Alpine, Baird Peak, and Manty Mountain, and the Kogish Mountain areas would not be significantly affected by proposed activities under this alternative. All these areas would have a small shift in acres to the RM class due in each case to a few units located on the edge of these areas.

Effects on the Paul Young Creek area are identical to those from Alternative F3. The lower portion of the drainage would change from SPNM to RM.

None of the Whale Pass–Mabel Creek–Barnes Lake area is affected by any harvest except for several units a few miles southwest of Gold and Galigan Lagoon which change a corner of this SPNM area to RM.

The Sarkar Lakes area would not be affected by this alternative.

Alternative F4 would result in approximately 16,000 acres shifting from SPNM or SPM to RM throughout the Project Area.

Alternative F5. The Trumpter Lake alpine, Baird Peak, Manty Mountain, Kogish Mountain, and Mabel Creek–Barnes Lake–Whale Pass areas would all have impacts similar to Alternative F4. In each case a few units along the edge of these areas would result in a small portion of them shifting to a RM class.

The Paul Young Creek drainage would not be affected by this alternative.

The Sarkar Lakes area would not be affected by this alternative.

Alternative F5 results in approximately 19,600 acres shifting from SPNM or SPM to RM throughout the CPOW Project Area.

Alternative F6. The Trumpter Lake alpine, Baird Peak, Manty Mountain, Kogish Mountain, and Mabel Creek–Whale Pass–Barnes Lake areas would all have impacts similar to Alternatives F4 and F5. As in these alternatives, a few units along the edge of these areas would have a small portion shifting to a RM class.

The Paul Young Creek drainage would not be affected by this alternative.

One unit near the edge of the Sarkar Lakes LUD II area would change a small portion of the Primitive portion of this area to SPNM. The sounds associated with logging may be audible from a portion of this system of lakes while road building and harvest is going on.

This alternative would result in approximately 18,700 acres shifting from SPNM or SPM to RM.

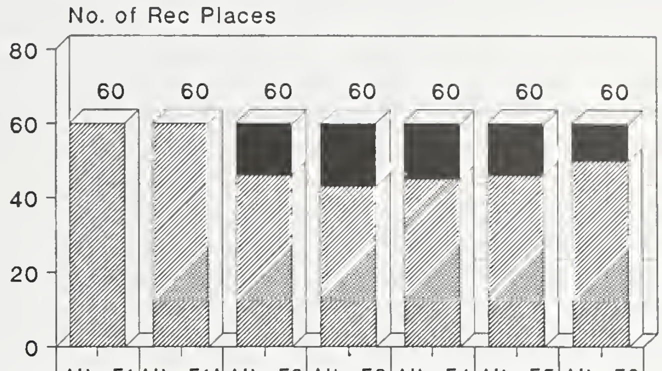
Recreation Places

People use specific Recreation Places for a variety of reasons with varying expectations. Changes in the setting due to timber harvest or road construction activities may alter the experience users are able to achieve from a specific site. Users will then be faced with the choice of continuing to use a site with an expected change in the recreational experience, or no longer using the site and possibly going elsewhere.

Harvest units or road construction within a Recreation Place which is currently in a primitive, semi-primitive non-motorized, or semi-primitive motorized class would generally cause it to be shifted to a Roaded Modified class. The roaded modified class involves a higher probability for interaction with other users, opportunities for more developed recreation facilities, and less opportunity for solitude. Harvesting units in places which are currently classified as roaded modified would result in further modifications to the existing setting and may or may not affect the public's desire to continue using it as a Recreation Place.

The current recreation inventory for the CPOW Project Area indicates 60 Recreation Places (see map, Figure 3-38). Thirty-four of these places will not be directly affected by proposed activities of the CPOW project, while 10–17 of them would be affected by at least one of the alternatives. Figure 3-40 summarizes by alternative the number of recreation places that are affected for one of the following reasons: because some portion would change from a primitive or semi-primitive class to a roaded class; because the proposed harvest would further alter the setting of the place; because the roading and harvest would potentially alter the access to the place; or because the harvest or roading would directly or indirectly affect a specific site.

Figure 3-40
Timber Harvest within Recreation Places



	Altn F1	Altn F1A	Altn F2	Altn F3	Altn F4	Altn F5	Altn F6
Rec place harvest	0	0	14	17	15	14	10
Rec place unharvest	60	60	46	43	45	46	50

Following is information for each of the affected Recreation Places. The numbers associated with the recreation place are for reference to Figure 3-38 and Table 3-103, earlier in this section. The narrative under each recreation place describes the specific impacts to each place in terms of how setting is changed (ROS class), change in access, and any specific impacts to sites.

2. **Neck Lake**. This place has been affected by a road system built over 20 years ago. Much of the area around the Lake was harvested at that time except for the north slopes of the lake which essentially remain in a natural condition. Though the area is already roaded modified due to past harvest, Alternatives F2 and F3 would further affect the relatively natural setting above the northwest corner of the lake. Alternatives F4, F5 and F6 do not further affect this recreation place since no units are proposed in these alternatives. Users are expected to continue using this place during any harvest activities

3. **Sarheen Cove**. Alternatives F3, F4, F5 and F6 propose harvest units on the edge of this recreation place, about one mile from the cove. Though harvest activities would temporarily be audible from the cove, the setting would not change because of the distance of the roads and harvest units from the cove and the fact that they would not be visible from the cove. Access to the cove would still be by boat. Alternative F2 proposes no new harvest within this area.

5. **Whale Pass**. This undeveloped cove is a key anchorage and provides fishing access. Alternatives F3 would change the character of about one-third of the acreage to RM by providing roaded access to within one-quarter mile of the stream and cove. Alternatives F2, F4, F5 and F6 would not affect this area. Solitude is expected to be more difficult to experience at this recreation place if constructed roads remain open after harvest. See the Transportation and Facilities section of this chapter for a discussion of the Access Management Plan.

6. **Salt Lagoon.** Alternatives F3, F4, and F5 plan additional harvest at the north end of this lagoon which is already heavily modified. Hence the recreation setting would not change. Alternatives F2 and F6 propose no new harvest in this area.

7. **Clam Cove.** Alternatives F3, F4 and F5 propose additional harvest in this roaded modified place. The unit is located within an area identified as having some potential for campground development. However, the site is not recognized as having very high priority for development compared to several other sites on Prince of Wales; hence, development of this site is not likely in the foreseeable future. Alternatives F2 and F6 would not affect this area.

8/9. **Sarkar Cove/ Sarkar Creek.** The Draft EIS proposed a unit in this area. However, no harvest is proposed in any alternative in the Final EIS. Hence, there would be no impacts to the Sarkar Cove or Sarkar Creek area.

13. **Kasaan Island**. Alternatives F2, F3, F4 and F5 would result in over 75% of this place changing to RM from SPNM. The access road to the proposed unit could come within one-quarter mile of the shore and ultimately provide some degree of roaded access to this coastal area, thus changing the focus of recreation opportunities provided by this place from marine oriented to road oriented.

15. **Naukati Lake Access.** All alternatives propose one unit on the edge of this small roaded modified portion of the Naukati Lakes area. This area surrounds a small lake that is accessed by the main road to Naukati. The unit is on the main road, but will not significantly change the setting of the area from the lake.

16. **Naukati Lakes.** Naukati Lakes is a semi-primitive non-motorized area of large muskegs and small lakes south of the small roaded lake described above. It is used primarily for hunting and hiking. However there are no developed trails in the area. All alternatives propose one unit on the eastern edge of this place that would shift from 100 to 300 acres of this 1,900-acre SPNM area to RM. Generally the recreation setting and use of the area would, therefore, not change significantly.

17. **Logjam Creek**. Fishing is the primary use of this Recreation Place. Recreational activities are currently located near a primary travel corridor. Solitude is not a critical component of this place. All alternatives propose a small unit that partially lays within the boundary of this roaded modified area. The harvest activity is not close to the prime fishing areas along Logjam. Hence there will be no impact on the recreation site or on the use of the area.

19. **Staney Creek**. This Recreation Place receives concentrated use in the vicinity of the cabin, the campgrounds, and along the creek. Alternatives F2, F4, F5 and F6 propose several units along the edge, but not within this corridor along Staney Creek. There would be no direct effects on these sites or to fishing areas along the creek. Alternative F3 proposes one unit that may be within several hundred feet of the campsite near Staney Creek bridge. Though the harvest may not be visible from the campsite due to the surrounding second growth, campers may choose not to use this site during road-building and logging operations.

23. **Kogish Mountain**. This alpine area is used primarily for hunting and hiking. Alternatives F2, F4, F5 and F6 propose slightly different levels of harvest near or just inside the edge of the northeast corner of this area, shifting anywhere from about 300 to 660 acres of this 3,300 acre SPNM area to RM. Alternative F3

proposes one unit just outside the edge of this place which results in about 100 acres shifting from SPNM to RM. Hence, there would not be significant impacts to the overall setting of the area. However, the additional roading may result in increased use of the area.

24. Upper Staney Creek. One half of this recreation place would change from SPNM to RM in alternatives F2, F4, F5 and F6. Use in the form of hunting will continue during and after harvesting operations. Alternative F3 proposes no harvest in this Recreation Place.

26. Staney Meadows. This scenic large meadow area is presently RM due to extensive areas around the meadow being harvested anywhere from 10 to 25 years ago. All alternatives except alternative F6 propose several units along the edge of the meadow and the edge of the road adjacent to the meadow. This harvest will further affect the scenic integrity of this meadow, thereby affecting the scenic viewing potential of this area. There may still be the opportunity to view wildlife in this area. Alternative F6 proposes one unit in the area. However, it harvests most of the last remaining old growth adjacent to the meadow, thus also affecting to a great degree the scenic integrity of the area.

27. Mabel Creek. This upper part of the Mabel Creek drainage is actually a portion of the Sarkar Lakes primitive Recreation Place. Alternative F2 proposes cutting unit 553-222 which is adjacent to the primitive recreation area. The cutting unit would not be visible from the Sarkar Canoe Route, but the proximity would change the ROS class of part of the upper section of the Sarkar chain of lakes from Primitive to SPNM. Much of upper Mabel Creek drainage would shift from primitive to roaded modified as discussed earlier in this analysis. Access to this area would be determined through Road Management Objectives.

30. Barnes Lake. Alternatives F2, F4, F5, and F6 propose no harvest within this semi-primitive motorized receation place or near its boundary. Alternative F3 includes a large number of units about three-quarters of a mile to the west of the lake and outside the recreation place. Though the ROS class of this place would not change, the sounds of logging and road-building would temporarily affect the recreation experience around the cabin located on the west shore of the lake. These alternatives will not affect this waterway's eligibility as a Scenic River as determined by the TLMP Draft Revision (1991a).

31. Gold and Galligan. Alternatives F2, F4, F5 and F6 propose no harvest in or near this semi-primitive motorized Recreation Place. Alternative F3 includes a few units just outside the boundary of this area about one-half mile west of the waterway. These units would not change the ROS class of this Place, though the sounds of harvest would temporarily affect the recreation experience. The harvest would not affect this waterway's eligibility as a Scenic River as determined by the TLMP Draft Revision (1991a).

36. Trumpter Alpine. Alternatives F2, F4, F5, and F6 will change approximately 300 acres on the edge of this 4,000 acre SPNM area to RM. This will not significantly change the overall setting of large alpine area that is used for hunting and dispersed hiking. This use will continue. Alternative F3 proposes no new harvest in this area.

37. Manty Mountain. Alternatives F2, F4, F5 and F6 would change from about 1,500 to over 1,800 acres of this 9,400-acre alpine hunting area from SPNM to

RM. Hunting activities are expected to continue, though there may be some short-term interruption of this activity should harvest occur during the hunting season. Alternative F3 proposes only one unit in this area, which would change about 150 acres from SPNM to RM.

38. **Luck Lake**. This Roaded Modified recreation place has extensive evidence of previous cutting activities, particularly around Luck Lake itself. The major impact from proposed harvest would be along the Eagle Creek portion of this area. Alternatives F2, F3, F4 and F5 propose a unit which borders a hiking trail used for access to fishing spots on the Creek. This unit (581-204B) has been modified by providing a larger buffer (300 feet) along Eagle Creek and also by partial cutting a portion of the unit. Alternative F6 does not include any harvest in this recreation place.

39. **Clarence Strait**. This 750-acre SPM Recreation Place just south of Eagle Creek has some potential for beachcombing and dispersed camping, and is used by some on Prince of Wales for hunting. Alternatives F2, F3, F5 and F6 extend the main road system a few miles north of Ratz Harbor along this Clarence Strait beach area. Anywhere from about 300 to 500 acres of this area would shift to RM depending on the level of harvest. These alternatives would create roaded access to some potential beach and other saltwater attractions. Alternative F4 proposes no roading or harvest along the beach in this area. However one helicopter unit above the beach would shift about 200 acres of this area to RM.

40. **North Baird**. All alternatives propose one harvest unit high on a ridge in the middle of this roaded modified place. The road access to this unit passes near a possible trailhead to the alpine around Baird Peak, which could enhance the opportunities for alpine hiking in this area.

41. **Baird Peak**. Alternatives F2, F4, F5 and F6 propose either one or two units on the edge of this 3,400-acre SPNM alpine area, which would shift from 150 to 350 acres to RM. These changes would not significantly alter the recreation setting of this area, which offers opportunities for alpine hiking from a trailhead located in the Recreation Place described above. Alternative F3 proposes no harvest in this area.

42. **Ratz Harbor**. All action alternatives propose a few harvest units in this RM Recreation Place. One unit is proposed close to the shore of Little Ratz and one close to the larger Ratz Harbor. Each would be partially visible and add to the altered character of the landscape. The unit in Little Ratz Harbor is about a quarter-mile south of a proposed small campground development along the shore of this small bay. It is scheduled for construction in 1995. If this development is completed before harvest takes place, logging activities may temporarily displace potential users of this campground.

45. **Slide Creek**. This is a heavily modified recreation place used for hunting, biking and other dispersed activities. Harvest units as proposed by all alternatives in the middle of this 7,500-acre RM area will create short-term impacts in the forms of noise and traffic. The overall impacts will be minimal.

52. **Thorne Bay**. This large bay with its extensive development, timber harvest and many residences scattered around the bay is classified as Rural. Alternatives F2, F4, F5 and F6 propose a few units along the south shore near the head of the bay. However, these units would not significantly change the setting of this area and

would have no impacts on recreation use of this bay. Alternative F3 proposes no harvest within this recreation place.

58. **Salt Chuck.** Alternatives F3, F4 and F5 propose a unit very close to the site of a historic mine near the head of this salt chuck. This site has been considered as a potential interpretive site. The unit would affect the natural integrity of the landscape around this potential recreation site. Alternatives F2 and F6 propose no harvest in this area.

60. **Lake Ellen.** Alternatives F3 and F4 propose a group of units in and near the Paul Young Creek drainage. The first of the units on this new road system is above the west shore of Lake Ellen. All these units change this area from lower Paul Young Creek north to Lake Ellen to RM. The Lake Ellen recreation place, therefore, changes from SPNM to RM. The lake was identified as a potential trail opportunity. However, the unit would not directly affect any existing or potential site or trail corridor. Alternatives F2, F5 and F6 propose no harvest in this area.

Wild and Scenic Rivers

No harvest units proposed by any of the alternatives lie within the one-quarter mile corridor adjacent to the Thorne River–Hatchery Creek waterway being considered for Recreation/Scenic River designation (TLMP Draft Revision 1991a). The outstanding characteristics of this river are scenery, wildlife, fisheries and recreation.

Alternative F3 does propose one unit (574-238) on the east slopes above Hatchery Lake. This unit is within the outer one-quarter mile "limited harvest" zone established in the 1984-89 Long Term Sale EIS for the Honker Divide Canoe Route. Only small units or partial cuts and very limited roading are allowed in this corridor under this guideline. It will be necessary to partial cut this unit, using uneven-aged management or small (one- to five-acre) group selection.

Units proposed in the Barnes Lake and Gold and Galligan areas are located so that they would not be seen from the water. The only anticipated effect will be temporary noise from active logging operations. This portion of the river is recommended for Recreation River designation, which does not preclude harvesting units.

Wilderness

The southeast boundary of the CPOW Project Area is adjacent to the Karta Wilderness Area. The nearest planned units are approximately 3,000 feet from the nearest Wilderness boundary. These units are proposed in Alternatives F3 and F4, but not in Alternatives F2, F5 and F6. An existing trail follows the Karta River drainage. New roads to proposed harvest units in the Paul Young Creek area could provide improved roaded access for people to park and hike into the Karta River drainage. The road providing access to the Paul Young Creek area would be gated and closed to all motorized vehicles following completion of harvest activities. This closure would remain in effect until the Karta Wilderness Implementation Schedule (WIS) determines the appropriate access for this area. (See the access management plan discussion in the Transportation and Facilities section of this chapter.)

Wilderness areas are usually designed to contain their own buffers or "transition zones" from the edges to the core of the Wilderness area, but proposed adjacent activities will have impacts on wilderness values. The indirect effects of nearby

harvests include a change in adjacent ROS classes and a resulting increase in demand on remaining primitive and semi-primitive recreation settings.

Roadless Areas

Table 3-106 shows the harvest acres proposed by the various alternatives within the inventoried roadless areas. It also shows the overall size of the roadless area, as well as the area within the CPOW Project Area.

Table 3-106
Harvest Acres within Inventoried Roadless Acres, by Alternative

Roadless Area	Total	CPOW	1	1a	F2	F3	F4	F5	F6
Kogish	72,261	16,665	0	0	851	418	1,002	1,373	1,485
Ratz	6,586	6,586	0	0	314	261	148	314	314
Sarkar	65,076	33,508	0	0	874	1,737	5494	323	
Karta	63,336	5,364	0	0	0	320	320	0	0
Thorne	91,530	33,227	0	0	1,545	722	1,173	1,466	1,474
Total	298,789	95,350	0	0	3,584	3,458	3,137	3,664	3,596

Effects on Resorts and Outfitter Guide Operations

Outfitter and guide operation success is very dependent on the experience that can be provided for each client. Road construction and timber harvesting activities which alter the natural setting and affect wildlife use patterns may have a negative effect on some of these operations. However, these roads would provide additional access into wildlife use areas, thereby increasing the opportunties for hunting.

Except for the proposed road into the lower Mabel Creek area in Alternative F3, there are no new proposed roads that would provide any new access to additional significant sport-fishing streams.

No units are proposed in the Sarkar Cove area that would affect the present setting around the El Capitan Lodge. Units above the southern shore of Whale Pass in Alternative F3 would change to some degree the natural setting in this area, but is not expected to directly affect the Whales Resort and its operations.

Cumulative Effects

Cumulative effects consider those events which are scheduled to occur in the reasonably foreseeable future. For this EIS, the reasonably foreseeable future is held to be the termination of the Long-Term Contract in 2004. Appendix A has scheduled subsequent timber entries of approximately 356 MMBF (12,478 acres) into the CPOW Project Area to occur by the termination date of the contract. Actual unit locations will be determined based upon future environmental analyses, so site-specific effects cannot be predicted at this time.

Cumulative effects will also be estimated for the end of the present rotation, around the year 2054.

In addition to the CPOW Project Area, this discussion will address the entire northern two-thirds of Prince of Wales Island from Cholmondeley Sound to Sumner Strait and the neighboring islands to the west.

Cumulative Effects to 2004

Overall Balance of ROS Classes Within Project Area. By 2004 much of the remaining semi-primitive areas would be converted to roaded modified, as the next series of timber entries are implemented.

Overall Balance of ROS Classes on Northern Two-Thirds of Prince of Wales Island. Prior to the Long-Term Contract, Prince of Wales Island was almost exclusively classified as primitive or semi-primitive non-motorized. Since the contract began, roaded areas have continued to expand over the northern two-thirds of the Island. Beginning with the implementation of the Alaska Native Claims Settlement Act in the early 1970's, this roading trend was hastened as large areas around Craig, Klawock, Klawock Lake, and Hydaburg were extensively roaded and logged. Today major semi-primitive and primitive areas in this part of Prince of Wales include the Karta Wilderness/Black Bear Lake area, the Calder/Holbrook and Outer Island LUD II areas, the Sarkar Lakes area, major portions of the Salmon Bay and Salmon Bay Lake area, the central portion of the Honker Divide area, much of the Thorne Mountain/Cutthroat Lakes area, the Clover Bay/Trollers Cove area, and the West Arm of Cholmondeley Sound.

Timber projects for the Long-Term Contract are also ongoing in the Polk/12-Mile Arm/Cholmondeley Sound area (Polk Inlet EIS), and the northern end of Prince of Wales (Lab Bay EIS). Timber harvest plans are commencing in the Control Lake/Honker Divide and Heceta Island areas. In addition, as a result of the Haida land exchange, another major portion of the Cholmondeley Sound area will be transferred to the Haida Village Corporation, and will eventually be roaded and logged.

As a result of this past and future roading and timber harvest, the remaining primitive or semi-primitive areas—in addition to the legislated Wildernesses and LUD II's—would include the Sarkar Lakes, Clover Bay/Trollers Cove, and a few smaller areas primarily in the CPOW and Polk Inlet/Cholmondeley areas. The Sarkar Lakes area would be the only semi-primitive or primitive area on Prince of Wales directly accessible from the island's Arterial or Collector roads.

Cumulative Impacts on Recreation Places in CPOW. Prior to the Long-Term Contract and subsequent development of the ferry terminal at Hollis, access to recreation places on Prince of Wales Island was almost strictly limited to saltwater and to floatplane access into the inland lakes. The Alaska Marine Ferry System now provides access to the island for residents and recreationists alike. The improved and expanded ferry schedule will facilitate increased demand for recreation opportunities. As more people visit some areas, there will be fewer chances of finding solitude.

Of the 20 presently remaining semi-primitive recreation places, about half would shift to the roaded part of the spectrum.

Therefore, some users seeking fewer contacts with others, fewer conveniences, and more natural-appearing settings would be displaced or dissatisfied. Other recreationists seeking easy access, developed facilities, and a higher probability of encountering others, would have more settings to choose from.

Based on the timber harvest schedule which calls for another 356 MMBF of volume to be taken from this Project Area before the year 2004 and an assessment of the location of the remaining available timber, it is estimated that the following recreation places will remain classified as semi-primitive motorized or semi-primitive non-motorized: Sarheen Cove, Sarkar Cove, part of the Gold and Galigan Lagoon and Barnes Lake areas, part of Forss Cove and Snug Anchorage, the Trumpter alpine area, the Manty Mountain area, and the Baird Peak area. There would be no primitive recreation places in the Project Area.

Cumulative Impacts by 2054 for the Project Area and the Rest of Northern Two-Thirds of Prince of Wales

By the year 2054, the second growth that will exist over this area will mature to 50 to 100 years old. Many of the roaded modified areas will become more natural appearing, though from the point of view of someone standing in the forest, they will still not look like the original old-growth stands. Where roads are not maintained and allowed to grow back to alder and eventually spruce/hemlock stands, the area will regain the conditions to bring it back to a semi-primitive non-motorized or primitive class. Areas where roads are only minimally maintained by clearing brush and periodic surfacing would probably meet the criteria for semi-primitive motorized. Areas where roads are intensively maintained and kept open for general public traffic would generally attain a roaded natural status until the second-growth stands were planned for harvest.

Cumulative Impacts to Recreation Places by 2054. For the reason described above, many of the recreation places currently classified as roaded modified would attain a more natural setting, at least in the portion of the place that is viewed from a distance from the site or activity area. However, because of continued long-term timber harvesting, the area is not likely to attain a roaded natural class or a more primitive class.

Roadless Areas

Prior to the Long-Term Contract, all of Prince of Wales Island was roadless. The TLMP Draft Revision has scheduled harvest of all suitable available land within the inventoried roadless areas in the Project Area, with the exception of the Sarkar Management Area and the Karta Wilderness. As timber harvest proceeds through the end of the termination of the Long-Term Contract, increasing harvest will occur within roadless areas, as they contain significant quantities of harvestable timber. This timber may become of increasing importance as timber harvest opportunities within previously harvested areas become limited by NFMA dispersion requirements. The currently inventoried roadless areas will gradually shrink, so that their largest components will include only those areas that the TLMP Draft Revision has reserved from cutting, as well as any areas that are determined to be inoperable.

Wild and Scenic Rivers

The TLMP Draft Revision has recommended the Hatchery Creek/Thorne River system for inclusion in the National Wild & Scenic River System. Future scheduled timber harvest—including both the portion within the CPOW Project Area and that portion which lies south of this area—will protect these rivers' values. The southern portion of the Thorne River will be included within the Project Area of the Control Lake EIS (187 MMBF), scheduled for 1994 (see Appendix A).

CULTURAL RESOURCES

Key Terms

Cultural Resources - all evidence of past human-related activity, dating from the earliest beginnings to the fairly recent past
Sensitivity Zone - Defined as "high," "medium," or "low," based on the probability that they might contain cultural resources.
SHPO - State Historic Preservation Officer

Affected Environment

Introduction

The CPOW Project Area has a diverse cultural history, which includes an occupation dating from the Paleomarine-Early Prehistoric Maritime period (10,000 B.C.–4500 B.C.) through the Northwest Coast Developmental Phase-Late Prehistoric Maritime period (4500 B.C.–A.D. 1700) to the protohistoric-historic Haida and Tlingit. It also considers the effect that various traders, miners, fishermen, loggers, subsistence users, and the USDA Forest Service (from 1907 to the present) have had on the area. Systematic archeological survey and excavation conducted within the boundaries of the Project Area indicate that it is likely Prince of Wales Island has been used continuously for at least the past 7,000 years.

Cultural resources include all evidence of past human-related activity, dating from the earliest beginnings to the fairly recent past. Cultural resources on the Tongass National Forest are varied and numerous, with sites ranging from prehistoric times through historic periods. Prehistoric remains include: campsites, village sites, graves, resource areas, rock art, portages, and rock shelters. Historic sites include: culturally modified trees, houses, cabins, mines, quarries, trails, portages, tramways, salteries, canneries, boatworks, boats, and shipwrecks.

The oldest sites located in Southeast Alaska to date are approximately 10,000 years old and are characterized by microblades (small stone blades with sharp cutting edges) and microblade cores (the prepared stone from which blades are removed) (Ackerman 1972; Davis 1979, 1990; Davis et al. 1989). These types of tools are thought to be associated with cultures which adapted to a marine resource economy, and which were present approximately 10,000 to 5,000 years ago. This technology seems to have been replaced by a ground and polished slate tool industry (Davis et al. 1989, Davis 1990).

Many of these cultural remains provide the only record of former human occupation, work areas, and lifestyles. Some of these sites may represent cultural traditions associated with early human migration into Alaska, and others may be significant for European exploration and historic economic development. Additionally, some areas may have traditional or spiritual significance for contemporary Native Alaskans. The

recovery of information from these sites and objects is important in reconstructing previous human behavior and adaptation in response to environmental or social change and, represent an important part of our local, regional, and national cultural heritage.

Ethnohistory

Prince of Wales Island is included in the traditional homeland of the Tlingit. Prior to and during European contact, the Project Area was occupied by three Tlingit groups: the Stikine (Shtax'heen Kwaan) whose territory included northeastern Prince of Wales from Tolstoi Bay to Red Bay; and the Henya (Heinyaa Kwaan) and Klawock (Lawaak Kwaan), whose territories were located on the western portions of Prince of Wales. Formerly the entire island had been occupied by Tlingit groups, with the Tongass Tribe (Tantakwaan) on the southern portions of the island. However, by the early 1700's the Kaigani Haidas migrated into the southern portions of Prince of Wales island and displaced the Tlingit. The territorial boundary of the Kaigani stretched from about Tolstoi Bay on the east to the vicinity of Craig on the western portion of Prince of Wales Island. See Figure 3-41 for territorial boundaries on the island. See Figure 3-42 for approximate locations of traditional land and resource uses in the CPOW Project Area.

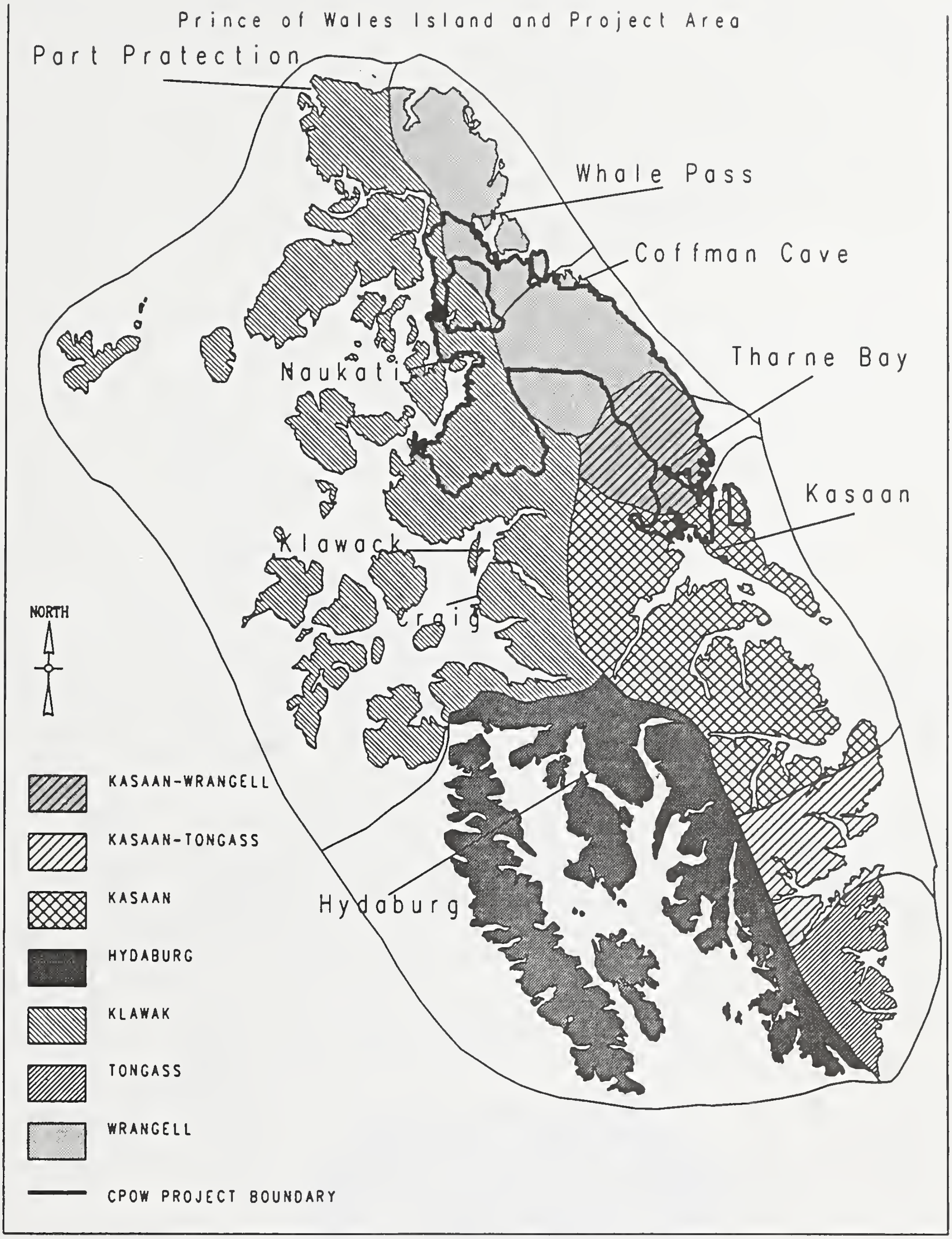
The historic period in Alaska began with the second Kamchatka Expedition of Vitus Bering in 1741 and developed through various stages of contact with European people and goods. By the end of the nineteenth century, separate settlements at Klawock and Hydaburg were established by white settlers and Natives, respectively. Historic explorations in the Project Area occurred in 1792 with Jacinto Caamano; 1794-1779 with Maurella, Perez and Bodega's expeditions; and in 1793 when George Vancouver's long boats explored Behm Canal and Clarence Strait with the British ships Discovery and Chatham (Mobley 1984, p.11; 1989, p.9).

Cultural Resource Inventory

In accordance with the National Historic Preservation Act of 1966, as amended, the National Environmental Policy Act of 1969, and a series of implementing regulations and policy direction, the Ketchikan Area of the Tongass National Forest is undertaking a program to identify, evaluate, preserve, and protect cultural resources as a nonrenewable national heritage. An Inventory Plan/Research Design has been prepared in consultation with the State Historic Preservation Officer (SHPO) that established survey methodology and intensity for the CPOW project, and provides direction for conducting archaeological surveys in certain prescribed areas of the Project Area. The purpose of the cultural resource investigations is to identify any possible impacts that the proposed activities would have on cultural resources in the area that may be eligible for inclusion in the National Register of Historic Places.

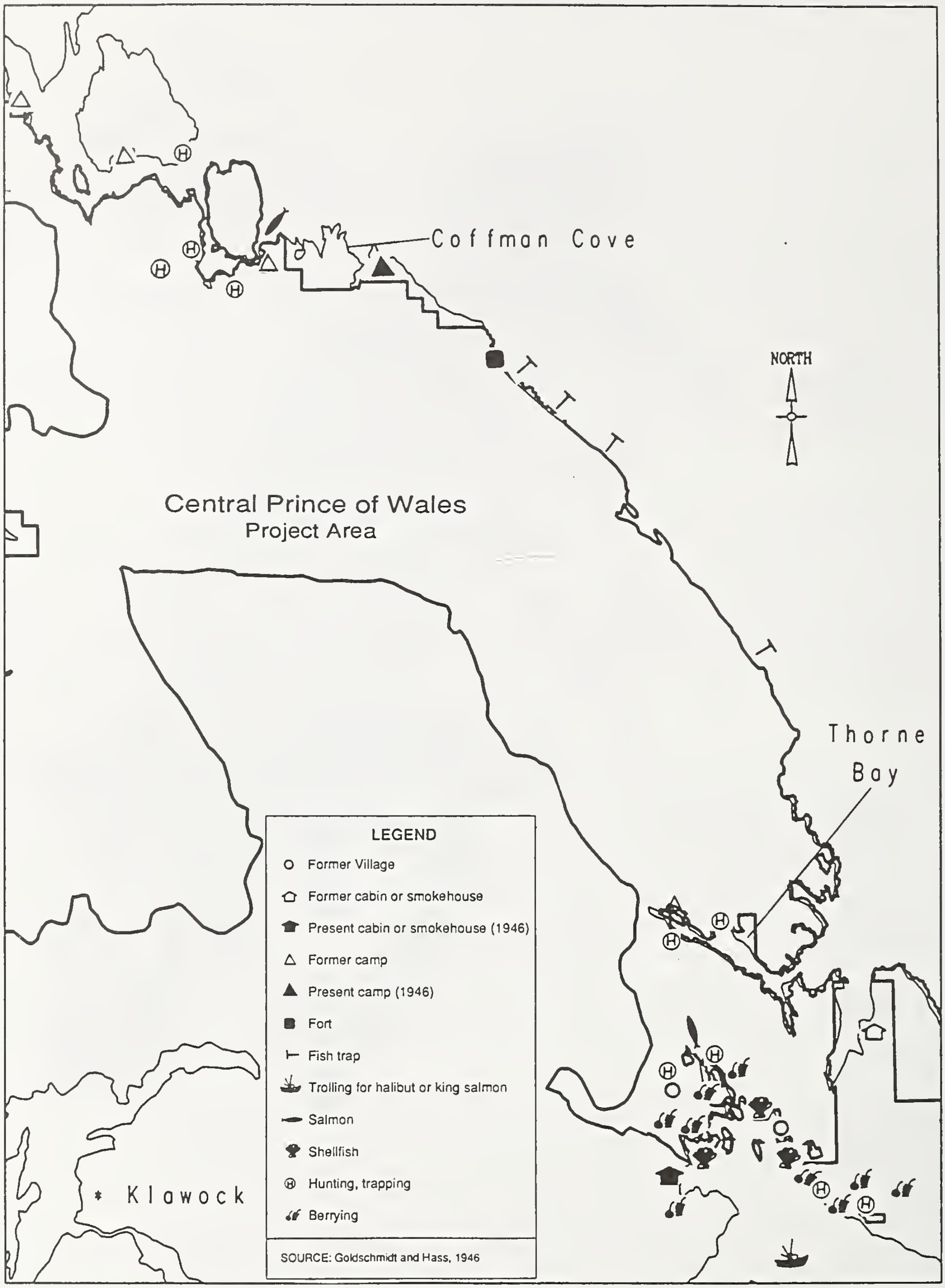
Cultural resources located within the Project Area represent an important part of our local, regional, and national cultural heritage. Cultural resources that remain on the Project Area are a nonrenewable resource and may not be duplicated elsewhere. Archaeological surveys provide opportunities to learn more about resource distribution, improved methods of site discovery, sensitivity to damage, and data collection. Inventory plans/research designs are updated as new information is generated to provide improved methods, technology, and resource management.

Figure 3-41
Primary Native Cultures



As depicted by Goldschmidt and Haas 1946.

Figure 3-42
Native Land and Resources Use



The west side of the Project Area is not shown on this map because Goldschmidt and Haas (1946) did not study that portion of Prince of Wales Island, and site-specific locations of traditional land and resource uses for that area are not readily available.

USDA Forest Service, Region 10 Cultural Resource Guidelines define high, medium and low sensitivity zones, which are based on the probability that they might contain cultural resources. Refinement of this concept and the elimination of the "medium" sensitivity zone is detailed within the Inventory Plan/Research Design. Through a review of existing data and analyses, areas of higher probability for locating various historic or prehistoric site types are determined. Designated high sensitivity zones, requiring a search of existing data and field investigation, include: all areas between zero and 100 feet above sea level, proximity to known site locations at any elevation, lakes and streams containing salmon species within 100 feet above sea level, passes and portages, known previous land use patterns, fossil beaches, and myth or legend sites. Low sensitivity zones include all other areas with slope angles greater than 30 percent, muskegs, and areas where, because of specific environmental conditions, the probability of the occurrence of cultural resources is so low it is essentially zero, as determined by review of existing data.

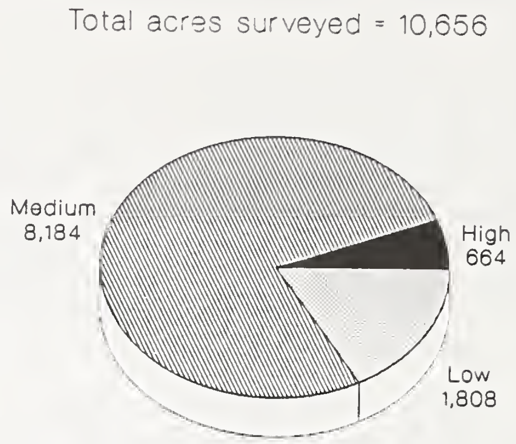
The analysis process for the CPOW cultural inventory began with an existing data search to identify any previous work and cultural sites located within the Project Area and/or near the proposed harvest units. A number of sources were consulted, including the Alaska Heritage Resources Survey (AHRS), the National Register of Historic Places (NRHP), the Forest Service site and survey files, and the Tongass National Forest Cultural Resources Overview (Arndt, Sackett and Ketz 1987). A literature overview that included ethnohistoric information pertinent to the Southeast Alaska Natives and other ethnic groups who have prehistoric and historic ties to the lands within the National Forest was supplemented by public comment and any additional reports submitted to the Forest Service that might pertain to the area presently under consideration.

Previous work included numerous surveys that were conducted in the Project Area at various levels of intensity, ranging from test excavations of identified cultural sites to cursory surveys (simply walking through areas that may contain archeological sites). Most of these surveys were conducted by Forest Service personnel in support of the timber sale program. Some 33 historic or prehistoric sites, and 15 mine sites have been identified in the CPOW Project Area.

Previous surface inspections account for approximately 10,656 acres within the Project Area with an average site density approximating one site per 133 acres in the High Sensitivity zone, one site per 8,184 acres in the Medium Sensitivity zone, and zero sites per acre in the Low Sensitivity Zone. The information gathered from the data search, and literature overview provided information about resource distribution, sensitivity to damage, and management of the resource.

Figure 3-43 shows the total number of acres in the Project Area where previous cultural surveys have been conducted.

Figure 3-43
Previous Cultural Surveys in the CPOW Project Area



The CPOW inventory strategy involved sampling of the study area based on survey that included all proposed project activity areas within the High Sensitivity Zone and additional areas where traditional subsistence activities and/or other cultural activities/sites were likely to occur. Specific areas of concern included: intertidal areas, beach fringes, riparian zones, resource procurement areas, uplifted fossil beaches, passes or portages, myth and legend sites, karst topography and mineralized zones. A variety of other characteristics were also considered in designing where the surveys were to be conducted, such as, eustacy (changes in sea level) and isostacy (rebounding of the earth's crust since deglaciation), and landform configurations. Because of elevational and sea level changes after deglaciation, the location of the earliest areas of human activity may be farther inland and at higher elevations than more recent human activity areas. The environmental characteristics that invited human use and habitation in prehistoric and historic times are often the same factors which invite use today.

Survey consisted of systematic pedestrian inspection of an area; subsurface examination through inspection of rootwads, cutbanks, or other natural exposures; and intensive soil probing or supplemental shovel testing as appropriate. This strategy resulted in maximum survey coverage in the areas of highest sensitivity for cultural resources.

Units selected for survey are listed in Table 3-107. These units were classified "high-probability" based on the following criteria:

1. Units with 2 or more acres < 100' elevation
2. Units in karst topography areas
3. Units bordered by Class I streams
4. Units adjacent to previously identified archaeological sites or mines

Units which are listed but do not appear in any alternative have been surveyed but have been dropped from consideration. There are no known myth or legend sites associated with these proposed activity areas.

Table 3-107
CPOW Units in Alternatives F2-F6 Designated for Complete Cultural Survey

Unit #	# Acres	Alternatives-F:	Criteria
549.2-201	31	3,4,5,6	3
-205	29	3,4,5	2
-206	37	3,4,5	2
-207	20	3,4,5,6	2
-230	31	3,4,5,6	2
550-206	16		2
-208	20	3,4,5	2
-209	34		2
-211	44	3,4,5,6	2
-213	39	2,3,4,5	2
-214	20		2
-215	37	2,3,4	2
-218	57	2,3,4,5	4 (site)
-220	62	2,3,4,5	2
-221	30	2,3,4,5	2
-222	24	2,3,4,5	4 (site)
-227	71	3	2
-228	50	3,4	2
-230	105		2
-237	36	3	2
-238	22	2,3	2
-239	95	2,3,4	2
552-201	60	3	1
-216	36	3	3
-221	56	3	1
-223	28		1
-226	16		1
-258	19		1,4 (site)
-262	28	3	1
-269	43		1
-270	20		1
-271	30		1
553-209	19		3
-211	50		3
-245	39	3	3
554.2-200	54	3,4,5	2
554.2-201	18	2,3,4,5,6	1
-206	46		1,4 (site)
-213	26	2,3,4,5,6	1,4 (mine)
-214	46		1

continued

Table 3-107 Continued

Unit #	# Acres	Alternatives-F:	Criteria
-215	27	2,3,4,5,6	2
-220	62	3,4,5	1,2,4 (site)
-225	25	3,4,5	1,4 (site)
557-200B	77	2,3,4,5	2
-202	42		2
571-214	34	2,3,4,5,6	2
-225	11	2,3,4,5,6	2
-227	122	2,3,5,6	2
-252	51	2,3,4,5	2
-253	91	2,3,4,5	2
-256	43	2,3,4,5	2
-257	66	2,3,4,5,6	2
-258	48	2,3,4,5,6	2
-260	61	2,5	2
-265	32		2
-266	73	2,3,4,5	2
-267	48	2,3,4,5	1,2
-268	64	2,3,4,5	2
-274	28	2,3,4,6	1,4 (site)
572-222	40	2,3,4,5,6	3
-226	30	2,3,4,6	3
573-210	21	3,6	1
-228	29	3	1,4 (site)
-264	67	3,6	3
-268	66	3,6	3
-274	63	2,3,4,6	1
-289	69	3,6	3
-296	73	3	1
-297	61	3	1,4 (site, mine)
-308	57	6	4 (site, mine)
-314	110	3	4 (site, mine)
577-202	21	3,4,5,6	2
-214	46	2,3,4,5	2
-280	18	2,3,4,5,6	2
-281	27	2,3,4,5,6	2
-284	48	2,3,4,5,6	2
-286	52	2,3,4,5,6	2
579-223	41	2,3,4,5,6	3

continued

Table 3-107 Continued

Unit #	# Acres	Alternatives-F:	Criteria
580-227B	42	3,5	2
581-204B	47	2,3,4,5	1
583-216	83	2,4,5,6	3
-229	53	2,3,4,5,6	1
-256	38	2,3,4,5,6	1
-258	81	3,4,5	1
584-250	52	2,3,4,5,6	1,4 (site)
-251	67	2,3,4,5,6	3
-252	27	2,3,4,5,6	1,4 (site)
-267	29	2,4,6	4 (site)
587.1-212	42	2,3,4,5,6	1
-212B	19	2,3,4,5,6	1
-214	35		1
-220	42	2,3,4,5	1
-221	38	2,3,4,5	4 (site)
588-215B	32	3	1
-237	41		3
598-203	44	3,4	4 (site, mine)
-206	26	3,4	4 (mine)
-218	58	2,3,4,5,6	3
-235	26	2,6	4 (mine)
-245	38	3,4,5	4 (site)
-249	73	3,4	1

Ore crushers from the early 1900's are among the cultural artifacts on Prince of Wales Island. Eric Johnston photo.

Results of Cultural Survey

Intensive cultural resources survey conducted during the 1992 field season has resulted in the inspection of 4,623 acres of proposed harvest units and 467 acres of additional areas of high sensitivity representative of all alternatives within the CPOW Project Area. These investigations located and documented seven previously undiscovered or undocumented cultural resource sites. All seven new sites discovered during survey of proposed CPOW harvest units will be completely protected by deferral of harvest in culturally sensitive areas. The results of these investigations has been formalized in clearance report documentation and forwarded to the SHPO for review as required by the National Historic Preservation Act and 36 CFR 800. Additional intensive survey efforts, documentation, and SHPO review will be required for road locations whose locations have not been firmly established (in areas of higher sensitivity), and/or should proposed activity areas be changed through project redesign, the acquisition of additional pertinent information, or as a result of SHPO comment prior to project implementation.

Specific locational information is protected, to prevent vandalism or unauthorized use of these sites.

Effects of the Alternatives

Direct and Indirect Effects

Types of Potential Impacts

The preservation and protection of cultural resources are closely associated with the location of the resource, the nature of the management activity, and the environmental characteristics where management activities occur. Impacts to the resource may occur from natural forces, from public access, or from project-related activities. Erosion and other environmental effects may also lead to deterioration of cultural resource sites.

Timber harvest activities include the construction and reconstruction of roads, which may lead to an increase in opportunities for public use of cultural resources in the Project Area. Such increased use may enhance understanding of the past—capturing knowledge and information that may disappear over time due to natural decay—and may provide opportunities for interpretation and education. However, public use may destroy cultural resource sites through inadvertent damage caused by compaction or other ground disturbing activities. Vandalism—including relic collecting, defacement, and theft—results in the loss of information and destruction of the resource. Protection of significant cultural resource sites from inappropriate public use includes the establishment of public education programs, maintaining confidentiality about specific site locations, monitoring, and directing public use away from the most vulnerable sites.

Specific CPOW Potential Impacts

Alternatives 1-F6 would result in no effects on cultural resources from the proposed activities, as a result of avoidance and implementation of proposed management recommendations.

Historic and prehistoric sites associated with proposed timber harvest have been evaluated for significance through established criteria in 36 CFR 800. Sites which were determined by this criteria to be eligible for the National Register of Historic

Places have been protected from potential effects of the proposed activities through avoidance, project redesign, and through monitoring during the implementation process.

Recommendations for special management consideration which eliminate potential effects to cultural resources include the elimination of specific units, and the modification of unit boundaries and road locations in the following locations: VCU 598, Salt Chuck Area; VCU's 573, 553, and 552, the Mabel Creek, Barnes Lake, and Sweetwater Lake drainages; VCU 554.2, the Sarkar area; and in VCU 550, the Neck Lake area. Concern for cultural resource values in these areas established through public comment has reinforced the results of on-the-ground survey and subsequent management recommendations.

SHPO concurrence that there would be no effect to significant cultural resource has been received for proposed activities in VCU's 549.2, 550, 571, 577, 580, 581, 583, and 584. Clearance for VCU's 552, 553, 554.2, 557, 572, 573, 579, 587.1, 588, and 598 is pending, but is expected well before project implementation.

Cumulative Effects

Impacts from natural decay, landscape changes, private developments, and timber management activities collectively result in the loss of the cultural resources in Southeast Alaska. Development activities of all kinds pose particular threats to cultural resources because such activities tend to be located in the same places that cultural resources are found, such as sheltered coastal settings.

It is impossible to determine the exact nature of resources that may have been previously disturbed in the Project Area. Intensive cultural resource investigations and mitigation measures have been implemented only since the 1980's. The implementation of updated research and survey designs based upon the results of previous work and current methodology and technology, combined with various mitigation measures, will preserve significant sites and provide data that will guide future research and resource management.

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SUBSISTENCE

Key Terms

Alaska National Interest Lands Conservation Act (ANILCA) - requires evaluations of subsistence impacts before changing the use of Federal Public lands
Non-rural - generally a community with more than 7,000 people; doesn't qualify for priority use of subsistence resources
Rural - any area of Alaska determined by the Federal Subsistence Board to qualify as such; qualifies for priority use of subsistence resources
Subsistence - customary and traditional uses by rural Alaskans of wild renewable resources
Wildlife Analysis Area (WAA) - a division of land designated by Alaska Department of Fish and Game and used by the USDA Forest Service for wildlife analysis

Affected Environment

The Alaska National Interest Lands Conservation Act (ANILCA) recognized the importance of subsistence resource gathering to the rural communities of Alaska. ANILCA defines subsistence as:

> "The customary and traditional uses by rural Alaska residents of wild, renewable resources for direct personal or family consumption as food, shelter, fuel, clothing, tools, or transportation; for the making and selling of handicraft articles out of nonedible byproducts of fish and wildlife resources taken for personal or family consumption; for barter, or sharing for personal or family consumption; and for customary trade."

ANILCA provides for "the continuation of the opportunity for subsistence uses by rural residents of Alaska, including both Natives and non-Natives, on public lands." It also legislates that "customary and traditional" subsistence uses of the renewable resources "shall be the priority consumptive uses of all such resources on the public lands of Alaska when it is necessary to restrict taking in order to assure continued viability of a fish and wildlife population or the continuation of subsistence uses of such populations."

Effective July 1, 1990, the management of subsistence use of fish and wildlife resources on Federal public lands became the responsibility of the Federal government. Management of subsistence fish and wildlife is regulated by the Federal Subsistence Board. The taking of fish and wildlife on public lands for subsistence uses under the Federal subsistence program is restricted to Alaska residents of rural areas or rural communities. Non-rural residents are not provided a preference for the taking of fish

and wildlife on public lands. Anchorage, Fairbanks Juneau and Ketchikan have been determined to be non-rural by the Federal Subsistence Board.

Many Southeast residents use natural resources as a base or supplement to their livelihoods. Nearly a third of rural households in Southeast Alaska get at least half their meat and fish by hunting and fishing (Holleman and Kruse 1991). Fish and game are widely preferred sources of food among Southeast households, regardless of their incomes. Examples of major subsistence resources include: deer, salmon, halibut, trout, harbor seals, crabs, clams, waterfowl, and berries (Kruse and Muth 1990).

Subsistence activities represent a major focus of life for rural residents. These resource or subsistence gathering activities include: hunting for deer, bear, marine mammals, and birds; digging clams; catching fish and shellfish (crabs, shrimp); harvesting marine invertebrates; trapping furbearers; collecting firewood; collecting herring and sea bird eggs; and collecting edible berries, plants and roots. Subsistence goods may be eaten, traded, given away, or made into an item of use or decoration. For example, the fur from the marten or sea otter may be used for regalia costumes which are used in ceremony and dance.

Even for households that can afford to purchase all their their own food, the act of gathering subsistence resources is an important cultural or social aspect reflecting deeply held attitudes, values, and beliefs. Some traditional foods are not available through any other means than subsistence, and the occasions for gathering wild foods and edible plants often are social events. Historical patterns of movement such as the annual cycle of dispersal into small family groups at summer fishing camps and then to larger gatherings at protected winter villages are also linked to the tradition of subsistence gathering. See the Cultural section of this chapter for a map of traditional Native lands in the CPOW Project Area.

Average per capita income may or may not indicate the importance of subsistence to a community. While individuals of low income may have a greater economic dependence on subsistence gathering, individuals with a higher income may desire to maintain the cultural or social tie to subsistence or simply be in a position to have a more comfortable lifestyle because they combine their subsistence activities with their ability to purchase goods. Higher income does not deter an individual from gathering resources and sharing those with friends and family (Kruse and Muth 1990). Findings from the Tongass Resource Use Cooperative Survey (TRUCS) (see below) indicate that "members of the highest income group have the highest mean harvest and the lowest mean percent of meat derived from subsistence activities" (Kruse and Muth 1990).

Sharing of subsistence resources is important not only among households within communities, but also with extended families and friends in other areas. This includes sharing with those households that are unable to participate in the harvest of resources. And because some communities have access to resources not found in other communities, sharing of subsistence resources occurs between as well as within communities.

Tongass Resource Use Cooperative Survey (TRUCS)

In 1988, a detailed subsistence resource and use inventory of the Tongass National Forest was started as part of the Tongass Land Management Plan (TLMP) Revision. The Tongass Resource Use Cooperative Study (TRUCS) of 1988 was conducted by the University of Alaska's Institute of Social and Economic Research in conjunction with

the U.S. Forest Service, and the Division of Subsistence of the Alaska Department of Fish and Game (Kruse and Frazier 1988).

In the TRUCS, reseachers went to over 30 communities in Southeast Alaska and conducted interviews with randomly selected households about their 1987 subsistence uses. As part of the interview, household residents were also asked to draw special maps of the areas used for hunting and fishing. As stated by Kruse and Frazier in the TRUCS (1988), all figures used in reporting subsistence are based on a sample of households. Therefore, it is possible that actual amounts harvested were either higher or lower than reported by sample households. A detailed description of the survey is found in the TRUCS Technical Report Number One from the Institute of Social and Economic Research, University of Alaska. Schematic maps of important subsistence use areas identified in the TRUCS are located in Appendix F of this EIS.

Goldschmidt and Haas (1946) identified the land-use patterns associated with Native communities that existed in the mid-twentieth century in Southeast Alaska. Comparing these maps with information from the 1988 TRUCS maps and ADF&G Subsistence Division maps, it appears that hunting and fishing use by Natives in Southeast Alaska is still tied to some extent to historical traditions determining who may hunt and fish on which lands. Despite the introduction of technological innovations (such as large, modern boats) that would allow residents of Native communities to range much greater distances than in earlier periods, their use appears to be concentrated in locations generally conforming to traditional clan land ownership boundaries. (See Figure 3-41 in the Cultural Resources section of this chapter for traditional Native boundaries on Prince of Wales Island, and Figure 3-42 for traditional Native land and resource uses in the CPOW Project Area). The distribution of harvest locations for non-Native communities, on the other hand, is often apt to range over greater areas.

Subsistence is a complex issue covering many aspects of lifestyles which are embodied in the people who reside in Alaska. In striving to be sensitive to the subsistence needs of the users of the CPOW Project Area, the Forest Service, with the help of the Alaska Department of Fish and Game (ADF&G) Subsistence Division and the Institute of Social and Economic Research (ISER), determined which communities should be included in the subsistence analysis for the CPOW project. To make this determination, data collected in the TRUCS (Holleman and Kruse 1991) and ADF&G deer harvest survey statistics were used to identify communities which use the Project Area for subsistence.

The following communities were selected to be analyzed in this document: Coffman Cove, Craig, Hollis, Hydaburg, Kasaan, Ketchikan, Klawock, Petersburg, Point Baker, Port Protection, Thorne Bay, Whale Pass, and Wrangell. Of these communities, all are designated rural except Ketchikan.

Affected Areas

Prince of Wales Island (POW) is located 28 air miles from Petersburg, 30 miles from Wrangell, and 20 miles from Ketchikan. The rural communities of Coffman Cove, Craig, Hollis, Hydaburg, Klawock, Point Baker, Port Protection, Thorne Bay, and Whale Pass are all located on POW and can access the Project Area via the existing road system. Prince of Wales Island is fairly accessible by boat from Wrangell and Petersburg. The Alaska Marine Highway provides service to Prince of Wales Island via the ferry terminal located at Hollis, thus making the CPOW Project Area accessible to other Southeast Alaska communities. The following discussion focuses on the areas

used by each community for subsistence. For other social and economic features of each community, see the Socio-Economic section of this chapter.

Coffman Cove

The alpine areas to the south are used for early season deer hunting. Fishing occurs in Eagle Creek and Hatchery Creek. The tidal flats extending east from Coffman Cove to Lake Bay and Barnes Lake are popular areas for waterfowl and bear hunting. Some trapping occurs along the shoreline of Sweetwater Lake, while the lower reaches of Logjam Creek and Sweetwater Lake are used for fishing.

Craig

Areas adjacent to the road system—Thorne River, Hatchery Creek, Logjam creek, Staney Creek and Sarkar Lake—are some of the major subsistence use areas within the CPOW project area.

Hollis

Areas within the Project Area used by Hollis residents include areas adjacent to the road system for deer hunting, and Staney Creek, Hatchery Creek, Logjam Creek, and Thorne River for fishing.

Hydaburg

Hydaburg subsistence use within the Project Area is dispersed throughout the area, according to TRUCS maps.

Kasaan

Areas used for subsistence purposes include Karta River for harvest of fish, particularly sockeye salmon; Salt Chuck for waterfowl and bear; and parts of Kasaan Peninsula for deer hunting.

Ketchikan

Ketchikan was not included in the TRUCS study, since it is defined as non-rural. Hence according to Federal law, Ketchikan does not quality for priority use of subsistence resources.

Klawock

Subsistence harvest methods within the community of Klawock have been changing since the road tie with Hollis was made in 1984. Prior to that time subsistence harvest was mostly tied to boating activities. Since road access to the rest of the island has been available to the residents of Klawock, there has been a shift from using boats to harvest subsistence materials, to using trucks and cars (Ellanna and Sherrod 1986).

Deer harvest takes places on the islands of Noyes, Lulu, San Fernando, San Juan Bautista, Suemez, Heceta, and St. Phillips. In the Project Area, deer harvest occurs along the entire road system (but primarily in the Staney Creek, Logjam Creek and Thorne River areas), and beach fringe areas. Duck and goose harvest occurs in Big Salt Lake.

Petersburg

Residents of Petersburg reported in the TRUCS survey and in a Survey of Harvest and Use of Fish and Wildlife Resources by Residents of Petersburg (Smythe 1988) that they used the entire area from Big Salt Lake east to Thorne Bay, north to the Sarkar Lake/Coffman Cove area for deer hunting.

Port Protection/Point Baker

While the most important subsistence use areas for Port Protection and Point Baker (North end of Kosciusko and Prince of Wales islands) are outside of the Project Area, several areas within the Project Area are also important hunting and fishing locations for the two communities, including Whale Pass, Deweyville/Sarkar Lake, Stevenson Island, and Ratz Harbor.

Thorne Bay

The extensive road system adjacent to the community provides numerous opportunities for residents to gather firewood, trees to saw into lumber for homebuilding, and access to hunting and fishing areas throughout the Project Area. Some trapping also occurs along the road system and beach fringe areas.

Whale Pass

The extensive road system adjacent to the community provides access to hunting and fishing areas throughout the Project Area. In addition to areas adjacent to the road system, the Naukati/Staney Creek area is used for deer hunting and fishing.

Wrangell

Residents of Wrangell used areas adjacent to the major road system and beach fringe within the Project Area for deer hunting, according to the TRUCS survey and the Wrangell Harvest Study (Cohen 1989).

Other Communities

In addition to those already discussed, the following are other communities that use the Project Area for subsistence gathering purposes: Edna Bay (the west coast beach fringe areas), Hyder (areas adjacent to the road system near Control Lake, Staney Creek, Logjam Creek and Luck Lake), Klukwan (Coffman Cove, Luck Lake and the Sweetwater Lake areas), Metlakatla (areas adjacent to the road system particularly in the Sandy Beach, Control Lake, Staney Creek, Sarkar Lake, Naukati and Whale Pass areas), Meyers Chuck (areas adjacent to the road system, Ratz Harbor and the Thorne Bay area), Labouchere Bay (the same areas identified by Point Baker and Port Protection residents), Naukati (the same areas identified by residents of Whale Pass, Coffman Cove and Klawock), and Saxman (areas adjacent to the road system for deer hunting, and Hatchery Creek for sockeye salmon). These communities were not considered to have high subsistence use of the area based on ADF&G deer harvest data (see Table 3-111, later in this section), and were not analyzed in detail in this EIS.

Table 3-108 presents information taken from the 1988 TRUCS report, summarizing the importance of subsistence use for individual communities using the Project Area.

Table 3-108
Per Capita Subsistence Harvest for Rural Communities Using the Project Area and Other Lands for Subsistence Gathering Activities, in Pounds

Community	Total Harvest	Deer	Other Mammal	Salmon	Other Fish	Shell-fish	Misc
Coffman Cove	186	60	1	52	56	10	7
Craig	185	41	9	40	63	26	6
Hollis	164	38	9	44	36	27	10
Hydaburg	337	43	8	137	83	52	14
Kasaan	186	40	2	32	33	72	7
Klawock	223	35	15	69	58	28	18
Petersburg	200	44	19	45	45	30	.17
Point Baker	345	89	30	89	68	49	20
Port Prot.	311	40	3	112	92	47	17
Thorne Bay	188	37	6	48	74	16	7
Whale Pass	186	50	19	41	38	34	4
Wrangell	164	20	24	30	43	41	6

SOURCE: TRUCS 1988

All 12 communities included in the analysis harvested more than 150 pounds of subsistence resources per capita in 1987. Three communities—Hydaburg, Pt. Baker, and Port Protection—harvested more than 300 pounds per capita. Klawock and Petersburg residents harvested 239 and 203 pounds per capita respectively.

Figure 3-44
Subsistence Harvest as Percent of Meat and Fish Consumed

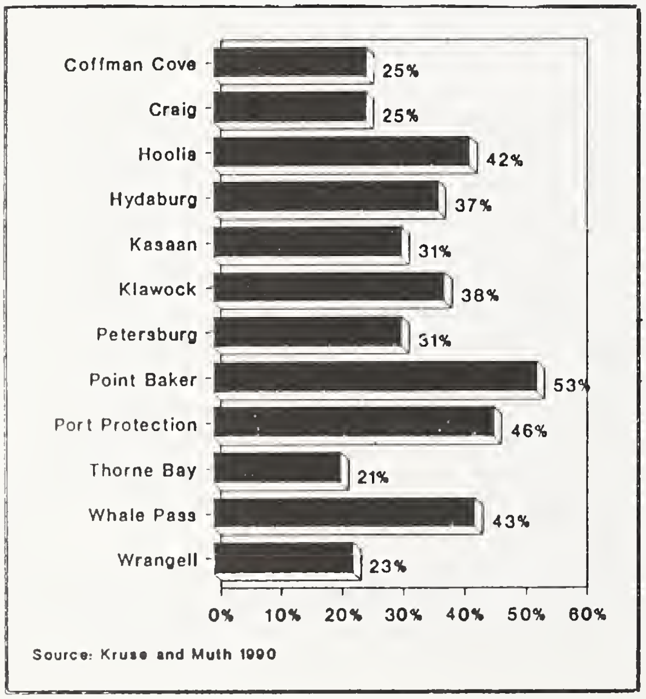
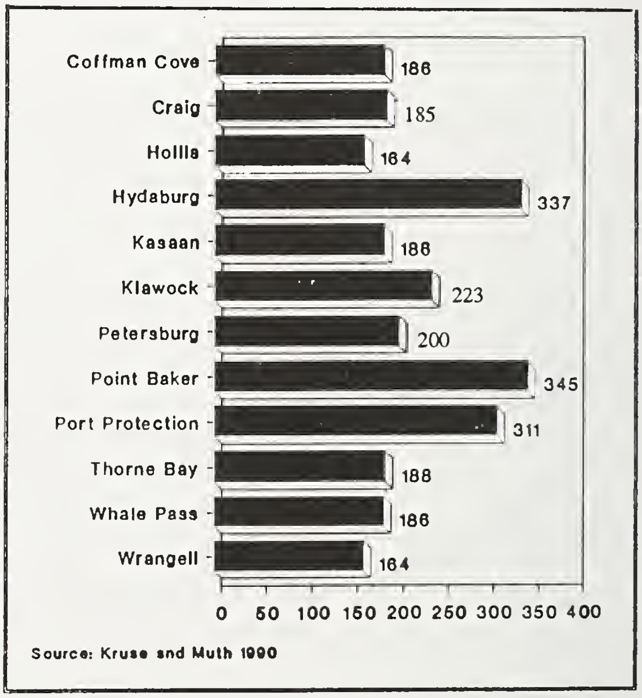


Figure 3-45
Pounds of Edible Subsistence Harvest Per Capita by Community



On average, households in all communities included in the analysis derived a quarter or more of the meat and fish they ate in 1987 from their own subsistence harvest. Point Baker, Port Protection, Whale Pass, and Hollis residents reported on average that more than 40 percent of their meat and fish came from their own subsistence harvest.

Affected Resources

The Project Area supports a wide variety of resources that contribute to the maintenance of the subsistence lifestyle. Identified activities include harvest of fish, waterfowl, bear, deer, furbearers, clams, crabs, and shrimp; and the gathering of berries and seaweed. In addition, many residents use trees for firewood and lumber. Of these resources, furbearers, bear, and deer may potentially be most affected by the CPOW project.

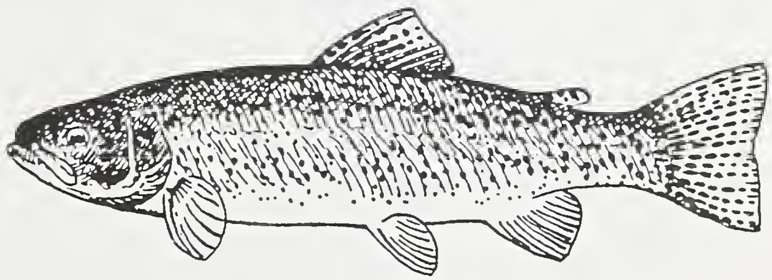
Fish

Salmon and trout are the principal subsistence fish resources in the affected area. Pacific salmon, with the exception of chinook (king), are harvested in both fresh and salt water in a variety of ways throughout the year (king salmon are not present in freshwater within the Project Area). The sockeye salmon is probably the most important subsistence species because of its high quality flesh and ease of harvest at traditional sites.

Traditional harvest sites for principal salmon species within the Project Area include:

Sockeye	Coho
Snakey Lakes Falls	North Thorne River Falls
Karta Falls	Upper and Lower Logjam Falls
Hatchery Creek Falls	Big Creek (108 Creek) Falls
Deweyville/Sarkar Lake Area	

Table 3-109 lists the stream, number of subsistence permits issued, and the number of fish taken by species for subsistence purposes. This table shows that the Deweyville/Sarkar area, Karta River, and Hatchery Creek are the major salmon subsistence streams. Table 3-110 shows the location of subsistence use fish permits, by community.



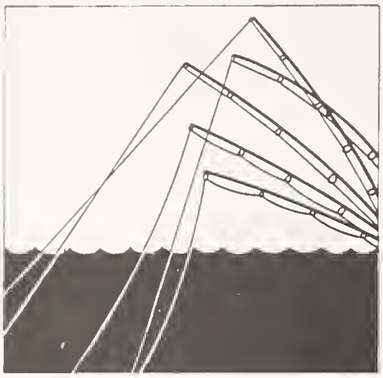


Table 3-109
Salmon Subsistence Permits and Harvest 1989-91

Location	Permits Issued	Chinook	Salmon Sockeye	Taken Pinks	Chums	Coho
1989						
Deweyville	10	0	77	0	10	10
Hatchery Creek	46	0	347	0	4	5
Karta River	130	0	1,607	20	1	9
Sarkar	83	17	1,134	9	0	13
Thorne River	6	0	50	0	0	2
1990						
Deweyville	32	0	382	0	0	0
Hatchery Creek	74	0	641	0	0	11
Karta River	116	0	1,219	6	0	9
Sarkar	9	0	100	0	0	0
Thorne River	14	0	131	116	0	0
1991						
Deweyville	43	0	676	0	0	1
Hatchery Creek	108	0	1,068	0	0	0
Karta Creek	41	0	370	3	4	1
Sarkar	15	0	197	0	0	0
Thorne River	4	0	58	0	0	0

Source: ADF&G Commercial and Subsistence harvest data.

Table 3-110
Location of Subsistence Use Fish Permits by Community.

Community	Deweyville	Hatchery Creek	Karta River	Sarkar	Thorne River
Coveman Cove		X		X	
Craig	X	X	X	X	
Hollis		X	X	X	X
Hydaburg			X		
Kasaan			X		
Klawock	X	X	X	X	
Petersburg					
Point Baker					
P. Protection					
Thorne Bay	X	X	X	X	X
Whale Pass	X	X		X	
Wrangell					

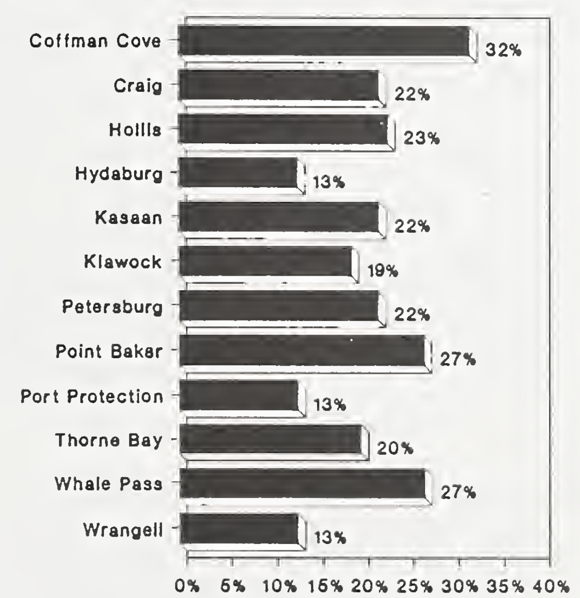
Deer

For record-keeping purposes, the ADF&G has broken its Game Management Units into smaller areas called Minor Harvest Areas (MHA), which are synonymous with the Wildlife Analysis Areas (WAA's) used by the Forest Service. Table 3-60 and Figure 3-19, in the Wildlife section of this chapter, display the Project Area VCU's located in the various Wildlife Analysis Areas.

The Sitka black-tailed deer is an important subsistence species found throughout the Project Area (Figure 3-46 and Table 3-111). Deer populations on Prince of Wales Island are now moderately high following a decline in the 1970's. The general hunting season is August through late December. Harvest is generally concentrated during two time periods: the first few weeks of the season in August, and later in November when the rut occurs. Although most of the early deer harvest occurs from or near a timber harvest access road (Mankowske 1985), a significant harvest effort is directed toward traditional alpine areas where deer, especially bucks, are concentrated during August. Traditional harvest areas within the Project Area that are accessible by foot through old-growth stands include:

Control Lake Mountains
Kogish Mountain
Ratz Mountain
Trumpeter Mountain
Twin Mountain (Staney)

Figure 3-46
Deer Harvest as Percent of Total Pounds of Subsistence Harvest, by Community



Source: Kruse and Frazier 1988

In 1987, deer constituted between 13 and 32 percent of the total subsistence harvest on average for households in Coffman Cove, Craig, Hollis, Hydaburg, Klawock, Kasaan, Petersburg, Point Baker, Port Protection, Thorne Bay, Whale Pass, and Wrangell.

Table 3-111
Average Deer harvest by Community*, by Project Area WAA's, 1987-91

Community	1315	1319	1420	1421	1422	1527	1530	Total
Coffman Cove	0	3	44	40	3	3	0	93
Craig	4	43	0	35	88	0	2	172
Edna Bay	0	0	0	0	0	0	0	0
Hollis	2	1	4	6	0	0	2	15
Hydaburg	0	10	4	2	2	0	0	18
Kasaan	6	0	0	0	0	0	0	6
Ketchikan**	37(1)	50(1)	54(1)	125(3)	104(2)	13(0)	61(1)	444
Klawock	4	27	5	20	37	9	0	102
Labouchere Bay	0	0	0	0	2	0	0	2
Metlakatla	0	0	0	0	2	2	0	4
Meyers Chuck	1	0	0	0	1	0	0	2
Naukati	0	0	0	0	22	0	0	22
Petersburg	3	6	8	8	3	0	5	33
Point Baker	0	0	0	0	0	0	0	0
Port Protection	0	0	0	0	0	0	0	0
Saxman**	1(1)	1(1)	0(1)	0(3)	0(2)	0(0)	0(1)	2(9)
Thorne Bay	85	139	15	23	33	2	2	299
Whale Pass	0	4	0	2	1	3	21	31
Wrangell	0	5	5	1	2	0	51	64
Other Alaska	1	4	0	1	0	0	2	8
Outside Alaska	1	3	0	3	2	0	0	9
Total Sub	108	244	86	141	198	19	86	882
Total Non-sub	37	52	53	125	104	13	60	444
TOTAL Harvest	145	296	139	266	302	32	146	1,326

*Includes additional communities as discussed in Affected Areas, earlier in this section.
**Number in parenthesis indicates harvest by Saxman resident but recorded as Ketchikan resident, as some Saxman residents have a Ketchikan Post Office Box (2% was assumed to be Saxman resident harvest because Saxman residents are 2% of the Ketchikan Borough population-309 of 13,828)
SOURCE: Matson 1993. Data derived from ADF&G harvest data.

Habitat capabilities and harvest numbers reported in this section are based on the entire WAA, whereas in the Wildlife section they are based only on the portion of the WAA within the Project Area. The Subsistence section analyzes habitat capability on an entire WAA basis to facilitate comparisons to animal harvest which are available from ADF&G records on a WAA as-a-whole basis. It is important to note that there will be considerable differences between the two sets of habitat capability numbers for this reason.

Table 3-112
Habitat Capability Compared to Demand for Sitka Black-tailed Deer, by Wildlife Analysis Area (WAA), in Numbers of Deer

WAA	Total Average Harvest 1987-91	Population Needed to Support Total Harvest*	Total Average Rural Harvest 1987-91	Population Needed to Support Rural Harvest*	Current Habitat Capability**	1954 Habitat Capability**
1315	145	1,450	108	1,080	4,124	5,620
1319	296	2,960	244	2,440	2,857	3,495
1420	139	1,390	86	860	1,253	1,938
1421	266	2,660	141	1,410	3,172	3,832
1422	302	3,020	198	1,980	4,687	5,992
1527	32	320	19	190	1,815	2,205
1530	146	1,460	86	860	2,036	2,764
Total	1,326	13,260	882	8,820	19,944	25,846

*Population needed to support harvest assumes a 10 percent harvest of the population as recommended by Flynn and Suring (1989).
**Harvest and habitat capability for whole WAA's including other ownership.
SOURCE: Matson 1993. Data derived from CPOW GIS data base, Suring 1988, and ADF&G harvest data.

Based on Table 3-112, habitat capabilities for Sitka black-tailed deer do not appear high enough to support the average level of harvest for 1987–1991 in WAA's 1319 and 1420. Habitat capability does appear adequate to meet current rural demand in all Project Area WAA's. Since rural use has priority over non-rural users, at some time in the future it may be necessary for the Federal Subsistence Board to restrict the number of deer harvested by non-rural hunters in order to leave adequate numbers of deer for subsistence users.

Table 3-113
Average Deer Harvest by Community, 1987-1991, and Percent of Total Harvest that Occurred in Project Area WAA's

Community	Ave. Deer Harvest Project Area WAA's	Ave. Deer Harvest All Areas	Percent of Harvest in Project Area WAA's
Coffman Cove	93	118	79
Craig	172	600	29
Hollis	15	30	50
Hydaburg	18	51	35
Kasaan	6	6	100
Ketchikan	444	1,601	28
Klawock	102	303	34
Petersburg	33	1,204	3
Point Baker	0	23	0
Port Protect.	0	5	0
Thorne Bay	299	357	84
Whale Pass	31	45	69
Wrangell	64	337	19

SOURCE: Matson 1993. Data derived from ADF&G harvest data.

Coffman Cove, Kasaan and Thorne Bay appear to be the most dependent on the Project Area for its deer harvest, deriving over 75 percent of their total harvest from the Project Area for the years 1987 through 1991. Ketchikan accounted for the greatest number of deer harvested within the Project Area (444), which amounted to 28 percent of that community's total deer harvest. Craig, Hollis, Hydaburg, Klawock, and Whale Pass also harvest a large percentage (29 to 69 percent) of their average deer harvest from the Project Area.

Black Bear

The TRUCS effort indicated that some black bear harvest was associated with subsistence use, but that community use varies widely. Table 3-114 displays the total black bear harvest by WAA by year. It appears that the recent harvest level is close to the current habitat capability for the Project Area. There may be some over-harvest of black bear occurring in WAA's 1315, 1420, and 1527 (based on the assumption that 10 percent of the habitat capability can be harvested on a sustained basis).

Table 3-114
Total Black Bear Harvest and Habitat Capability by Year, in Numbers of Bears

WAA*	1986	1987	1988	1989	1990	1991	Average Harvest Per Year	Population Needed to Support Harvest**	1990 Habitat Capability
1315	18	8	9	12	19	11	13	130	101
1319	5	7	4	7	10	14	8	80	175
1420	5	4	4	13	9	17	9	90	65
1421	2	6	2	1	2	5	3	30	158
1422	32	18	12	14	22	16	19	190	206
1527	21	16	25	21	5	10	16	160	74
1530	0	0	0	0	2	11	2	20	100
TOTAL	83	59	56	68	69	84	70	700	879

* Includes entire WAA, including portions outside the Project Area.
** Population needed to support harvest assumes a 10 percent harvest of the population. (D.Larsen, ADF&G, pers. comm.)
SOURCE: Matson 1993. Data derived from ADF&G harvest data.

In GMU 2 since the 1985-86 bear season, 596 bears were harvested by Alaska residents and 510 were harvested by nonresidents. This amounts to 54 percent of the bears being harvested by Alaska residents, 46 percent by nonresidents. Of the 54 percent attributable to Alaska residents, a percentage was harvested by residents of communities that are classified as non-rural. Table 3-115 displays the bear harvest by residents of rural communities by WAA. It appears that habitat capability in all WAA's is sufficient to meet the demands of rural residents.

Table 3-115
Subsistence Black Bear Harvest and Habitat Capability by Year, in Numbers of Bears

WAA*	1986	1987	1988	1989	1990	1991	Average Harvest Per Year	Population Needed to Support Harvest**	1990 Habitat Capability
1315	4	2	6	6	7	5	5	50	101
1319	5	3	4	4	5	10	5	50	175
1420	1	1	2	4	5	2	3	30	65
1421	2	2	2	0	1	0	1	10	158
1422	15	7	6	4	3	2	6	60	206
1527	4	4	5	5	0	2	3	30	74
1530	0	0	0	0	0	2	1	10	100
TOTAL	31	19	25	23	21	23	24	240	879

* Includes entire WAA, including portions outside the Project Area.
** Population needed to support harvest assumes a 10 percent harvest of the habitat capability. (D.Larsen, ADF&G, pers. comm.)
SOURCE: Matson 1993. Data derived from ADF&G harvest data.

Waterfowl

A variety of species of ducks, along with Canada geese, are widely hunted in the Project Area, primarily along bays and estuaries. Identified sites with a history of high use that are within the Project Area include:

- Big Creek
- Grassy Flats (Coveman Cove)
- Gold and Galligan Lagoon
- Coffman Cove Estuary
- Staney Creek Estuary
- Salt Chuck (Lake Ellen)
- Thorne River Estuary

Furbearers

Furbearer harvest supplements the seasonal income of some area residents, most of whom are subsistence users. Different levels of trapping intensity exist, from the occasional trapper who targets primarily marten and beaver close to the road system, to those individuals pursuing all furbearers both near to and far from the road system. Harvest effort usually is concentrated along the salt water-upland interface, and near or along major river systems. Martens appear to be the most old-growth associated of the furbearers, and are trapped intensively in old-growth areas adjacent to the road system.

Tables 3-116 and 3-117 display the marten and river otter harvest by WAA. There are wide yearly variations in harvest levels. These tables show that recent harvest levels of marten and river otter are within the current habitat capabilities of the Project Area, although there may be some over-harvest of marten in WAA's 1420 and 1527, and of river otter in WAA 1527. Numbers derived from habitat capability models for marten do not take into account road densities and the resulting increase in harvest pressure (see Biodiversity section for discussion and display of those effects).

Table 3-116
Marten Harvest and Habitat Capability, by WAA, in Numbers of Marten

WAA*	84-85	85-86	86-87	87-88	88-89	89-90	Average Harvest per Year	Pop Needed to Support Harvest**	1990 Habitat
1315	26	2	23	64	28	19	27	68	115
1319	34	27	6	46	53	49	36	90	165
1420	30	0	5	71	41	67	37	90	54
1421	72	3	2	69	19	38	34	85	174
1422	70	47	6	69	114	75	64	160	206
1527	22	42	15	65	19	27	32	80	69
1530	0	0	0	0	0	0	0	0	107
TOTAL	254	121	57	384	274	275	230	575	890

*Includes entire WAA, including portions outside the Project Area.
**Population needed to support harvest assumes a 40 percent harvest of the habitat capability as recommended by ADF&G.
SOURCE: Matson 1993.

Table 3-117
River Otter Harvest 1984-1990, in Numbers of Otter

WAA*	84-85	85-86	86-87	87-88	88-89	89-90	Average Harvest per Year	Pop Needed to Support Harvest**	Current Habitat Capability
1315	10	4	0	7	-	1	5	25	54
1319	5	11	2	11	-	0	6	30	38
1420	12	5	0	0	-	0	3	15	16
1421	6	2	0	4	-	4	3	15	47
1422	18	1	0	36	11	0	11	55	74
1527	2	38	15	16	4	0	13	65	28
1530	0	0	0	0	0	0	0	0	48
TOTAL	53	61	17	74	15	5	41	205	305

*Includes entire WAA, includes portions outside the Project Area. **Population needed to support harvest assumes a 20 percent harvest of the habitat capability as recommended by ADF&G.

The average harvest of wolves appears to be within the sustained habitat capability for all Project Area WAA's except for WAA 1420. Project Area wide, the wolf harvest appears to be sustainable.

Table 3-118
Gray Wolf Harvest 1984-1990, in Numbers of Wolves

WAA*	84-85	85-86	86-87	87-88	88-89	89-90	Average Harvest per Year	Pop Needed to Support Harvest**	Current Habitat Capability
1315	3	2	2	5	n/a	1	3	10	10
1319	1	1	3	3	n/a	5	3	10	12
1420	9	1	0	3	n/a	3	3	10	4
1421	0	2	0	3	n/a	3	2	7	12
1422	9	1	4	1	n/a	4	4	13	17
1527	4	0	2	3	n/a	2	2	7	6
1530	0	0	0	0	n/a	0	0	0	7
TOTAL	26	7	11	19	n/a	16	17	57	68

*Includes entire WAA, including portions outside the Project Area. **Population needed to support harvest assumes a 30 percent harvest of the habitat capability.

Firewood and Lumber

Use of both live and dead timber occurs thoughout the Project Area. Most homes use firewood as the principal heat source because of the great abundance of dead and

downed timber. Personal use of green timber as a source of construction lumber is extensive and expected to increase as the population increases.

Other Uses

Many other subsistence uses of the natural resources occur. Some examples are berry picking, mushroom gathering, use of Native plants for arts and crafts, collecting of other edible plants and animals, collection of peat and seaweed for gardens, and use of sand, gravel and rock for building purposes. Most of these activities are not associated with a particular site, but rather occur throughout the Project Area.

CPOW Areas Ever Used for Deer Hunting

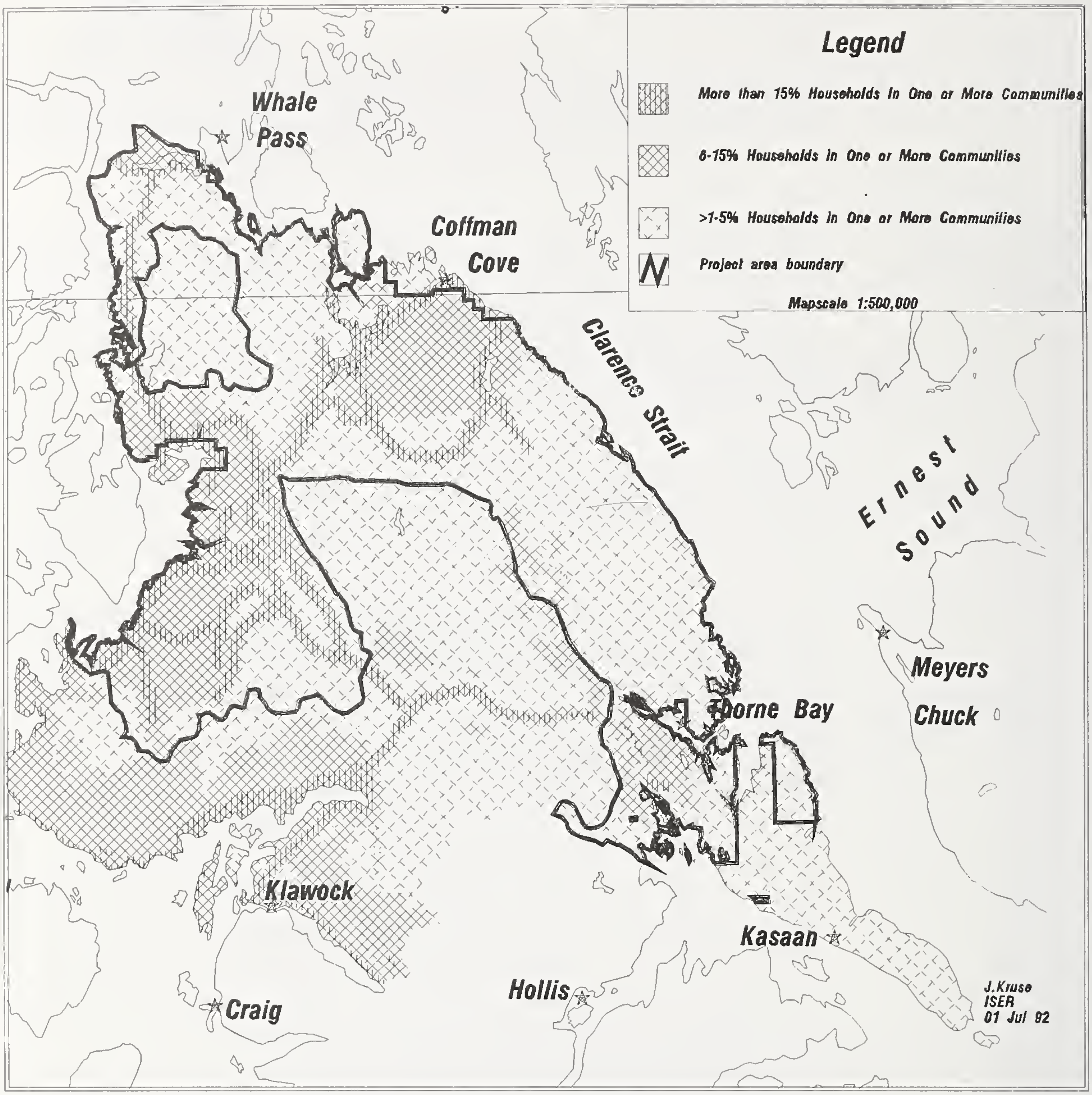
Jack Kruse, University of Alaska, Anchorage, Institute of Social and Economic Research, mapped the percentage of households that ever hunted the area for deer and calculated the acreage within the Project WAA's used by 15 percent or more of the households in each community (Table 3-123, later in this section). Maps are included in Appendix F showing the percentage of households ever using the Project Area and surrounding areas for deer hunting, by community. Use patterns vary greatly by community.

Results displayed in Table 3-123 show that Coffman Cove, Craig, Klawock and Thorne Bay residents utilize the most acres within the Project Area WAA's. Port Protection, Point Baker, Hydaburg, Petersburg, and Wrangell residents appear to focus most of their deer hunting outside the Project Area WAA's. Table 3-123 also displays the acres used for subsistence deer hunting that would be harvested or have a road built, by alternative.

Another method to determine the importance of the Project Area to a subsistence community is to determine the number of deer harvested from the Project Area WAA's and compare that to the total number of deer harvested by that community. Thorne Bay and Coffman Cove harvested more than 75 percent of their deer from the Project Area; 100 percent of Kasaan's deer harvest came from Project Area WAA's (Table 3-113). Klawock residents heavily use the road system and to a lesser extent coastal areas, most of which are located outside the project WAA's. Coffman Cove residents use a relatively small section of the road system and surrounding areas, or areas along the coast. Craig resident hunting patterns are more dispersed: within the road system from Control Lake to Sarkar Lakes, including the Staney Creek area for deer hunting. Thorne Bay residents primarily use areas within the Project Area WAA's that can be accessed by road for deer hunting. Kasaan resident use is concentrated along the coast near Salt Chuck and Karta Bay of Kasaan Bay and upland behind the community. Most deer hunting by Hollis residents occurs outside the Project Area WAA's. Within the Project Area, Hollis hunting occurs primarily south of Coffman Cove. Whale Pass residents concentrate their deer hunting activity within the project WAA's along the road system near their community. Point Baker and Port Protection residents do not use the Project Area heavily. There is some minor use along the coast and the road system in the Sarkar Lakes vicinity. Small percentages of Hydaburg residents report using the entire Project Area. Significant use, however, appears to be limited to the road system between Klawock and Coffman Cove.

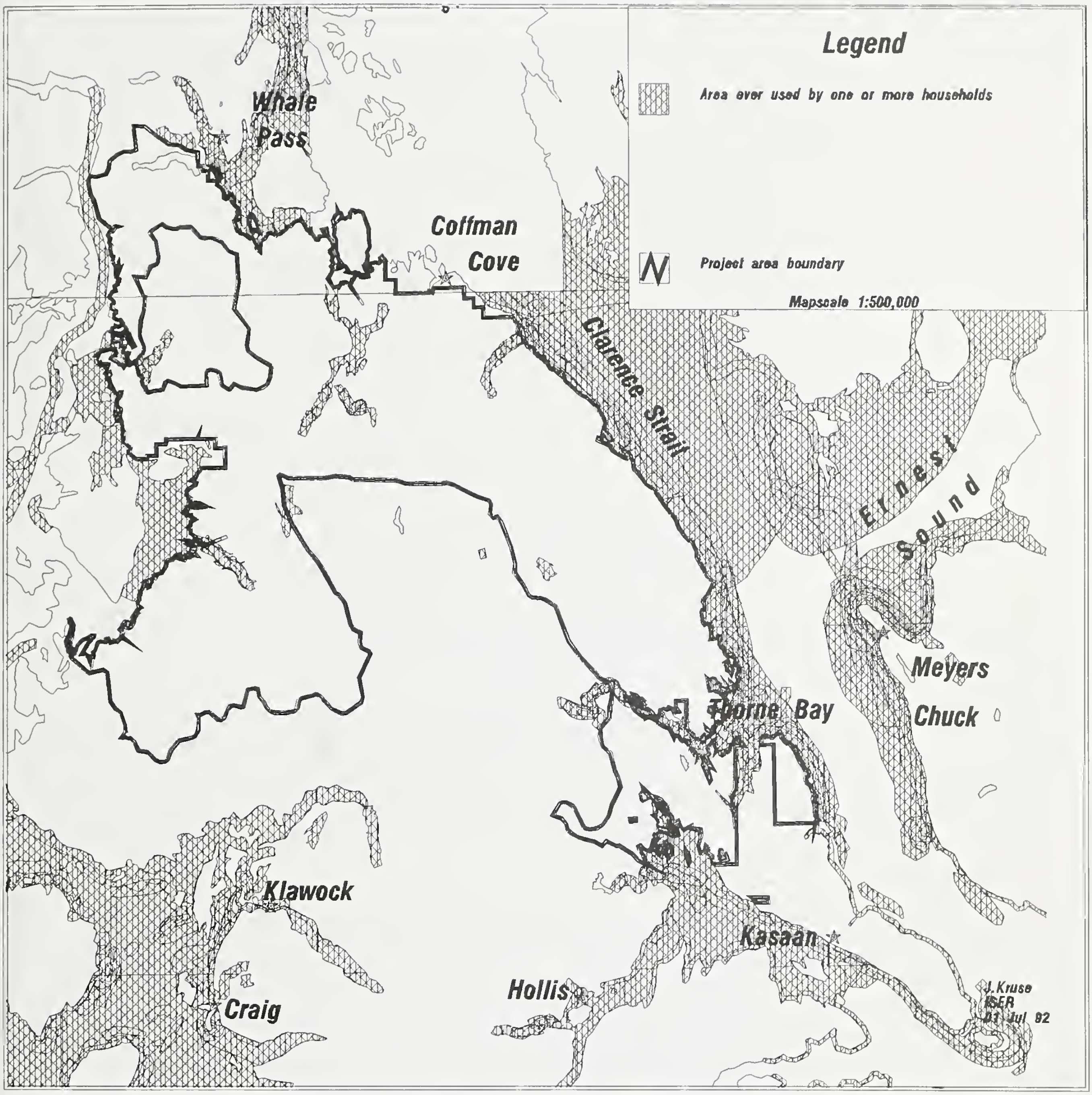
Figures 3-47 and 3-48 illustrate areas in CPOW where households have ever hunted deer or fished for salmon.

Figure 3-47
CPOW Areas Where Households Have Ever Hunted Deer



SOURCE: J.Kruse, ISER, 1992.

Figure 3-48
CPOW Areas Where Households Have Ever Fished for Salmon



SOURCE: J.Kruse, ISER, 1992.

Effects of the Alternatives

Introduction

Section 810 of the Alaska National Interest Lands Conservation Act (ANILCA) requires a Federal agency having jurisdiction over lands in Alaska to evaluate the potential effects of proposed land-use activities on subsistence uses and needs. Section 810 of ANILCA states:

> "In determining whether to withdraw, reserve, lease, or otherwise permit the use, occupancy, or disposition of public lands under any provision of law authorizing such actions, the head of the agency having primary disposition over such lands or his designee shall evaluate the effects of such use, occupancy, or disposition on subsistence uses and needs, the availability of other lands for purposes sought to be achieved, and other alternatives which would reduce or eliminate the use, occupancy, or disposition of public lands needed for subsistence purposes. No such withdrawal, reservation, lease, permit, or other use, occupancy or disposition of such lands which would significantly restrict subsistence uses shall be effected until the head of such federal agency:
> 1. gives notice to the appropriate state agency and appropriate local committees and regional councils established pursuant to ANILCA Section 805;
> 2. gives notice of, and holds, a hearing in the vicinity of the area involved; and
> 3. determines that (A) such a significant restriction of subsistence uses is necessary and consistent with sound management principles for the utilization of the public lands; (B) the proposed activity will involve the minimal amount of public lands necessary to accomplish the purposes of such use, occupancy, or other disposition; and (C) reasonable steps will be taken to minimize adverse impacts upon subsistence uses and resources resulting from such action."

This section evaluates how the proposed action alternatives could affect subsistence resources used by the rural communities in the Central Prince of Wales Project Area, including: Coffman Cove, Craig, Hollis, Hydaburg, Kasaan, Klawock, Petersburg, Point Baker, Port Protection, Thorne Bay, Whale Pass, Wrangell, and the non-rural community of Ketchikan. The subsistence resource categories evaluated are deer, furbearers, waterfowl, black bear, marine mammals, salmon, other finfish, shellfish, other food resources, and firewood.

Criteria used to evaluate the effects of the proposed alternatives are: (1) changes in abundance or distribution of subsistence resources; (2) changes in access to subsistence resources; and (3) changes in competition from nonsubsistence users for those resources. The evaluation determines whether subsistence opportunities in the Project Area or portions of the Project Area may be significantly restricted by any of the proposed action alternatives. To determine this, the evaluation: (1) considers the availability of subsistence resources in the surrounding areas; (2) considers the cumulative impacts of past and foreseeable future activities on subsistence users and resources; (3) looks at potential cultural and socio-economic implications affecting subsistence users; and (4) focuses on the mapped subsistence use area in the Project Area.

The evaluation relies heavily upon the use of wildlife habitat capability models as well as upon ADF&G hunter survey data.

The discussion of abundance, distribution, access, competition, and cumulative effects for deer appears as a separate section, and includes a community-by-community analysis. The remaining resources and a summary of findings are treated under the section called Direct, Indirect, and Cumulative Effects on Other Resources: abundance and distribution, access, competition, and cumulative effects.

This subsistence evaluation considers, with distinct findings by alternative and by resource category, whether or not there is a significant possibility of a significant restriction of subsistence use. The Alaska Land Use Council's definition of "significantly restrict subsistence use" is one guideline used in the findings. By this definition:

> "A proposed action shall be considered to significantly restrict subsistence uses, if after any modification warranted by consideration of alternatives, conditions, or stipulations, it can be expected to result in a substantial reduction in the opportunity to continue subsistence uses of renewable resources. Reductions in the opportunity to continue subsistence uses generally are caused by: reductions in abundance of, or major redistribution of resources; substantial interference with access; or major increases in the use of those resources by non-rural residents. The responsible line officer must be sensitive to localized, individual restrictions created by any action and make his/her decision after a reasonable analysis of the information available."

The U.S. District Court Decision of Record in Kunaknana v. Watt provided additional definitions of "significant restriction of subsistence uses" and are also used as guidelines in the findings. The definitions from Kunaknana v. Watt include:

> "Significant restrictions are differentiated from insignificant restrictions by a process assessing whether the action undertaken shall have no or slight effect as opposed to large or substantial effects. In further explanation the Director (BLM) states that no significant restriction results when there would be 'no or slight' reduction in the abundance of harvestable resources and no occasional redistribution of these resources; there would be no effect (slight inconvenience) on the ability of harvesters to reach and use active subsistence harvesting site; and there would be no substantial increase in competition for harvestable resources (that is, no substantial increase in hunting by non-rural residents)."

Conversely, restrictions for subsistence uses would be significant if there were large reductions in abundance or major redistribution of these resources, substantial interference with harvestable access to active subsistence-use sites, or major increases in non-rural resident hunting. In light of this definition, the finding of significant restriction must be made on a reasonable basis, since it must be decided in light of the total subsistence lands and resources that are available to individuals in surrounding areas living a subsistence lifestyle. This EIS evaluates the availability of subsistence resources in surrounding areas that could be accessed.

Subsistence Use Areas

Specific areas within the Central Prince of Wales Project Area are of special importance for harvesting subsistence resources. Figures 3-47 and 3-48 (earlier in this section) depict CPOW regional harvest of deer and salmon. The subsistence use areas depicted on these maps were developed from the TRUCS data base by J. Kruse. Only rural communities were surveyed by TRUCS; therefore, use of the Project Area by Ketchikan residents is not depicted. The salmon harvest map (Figure 3-48) has areas highlighted where one or more households have ever harvested the resource. The deer harvest map (Figure 3-47) depicts three intensities of use: where more than 15

percent of households in one or more communities have ever harvested deer, where 6–15 percent of households in one or more communities have ever harvested deer, and where 1–5 percent of households in one or more communities have ever harvested deer. The heaviest deer harvest use is concentrated along areas where logging roads provide access to the Project Area.

The areas of most subsistence use are the areas adjacent to existing road systems, the beaches, and the areas in close proximity to communities. Within the Project Area, the extent and location of the subsistence use (some communities identified the entire Project Area or large portions of it), precludes complete avoidance of all areas if wood is to be harvested. Areas other than subsistence use areas that could be harvested may be limited by other resource concerns such as: soil and water protection; high value wildlife habitat; economics; visuals; or unit and road design. Effort was taken to protect the highest value subsistence areas. For example, beach fringe is one of the highest use subsistence areas, and none will be harvested under any of the proposed alternatives.

Much of the data in this section is analyzed by Wildlife Analysis Areas (WAA'S), management units delineated by the Alaska Department of Fish and Game and used by the Forest Service for wildlife analysis and planning purposes. WAA's that are partly within the Project Area are 1315, 1319, 1420, 1421, 1422, 1527, and 1530 (see Figure 3-19, in the Wildlife section of this chapter). For a list of all the VCU's within WAA's, see Table 3-60, in the Wildlife section.

Direct, Indirect, and Cumulative Effects on Deer

Deer: Abundance and Distribution

Table 3-119 shows the average deer harvest for 1987 through 1991 for Project Area WAA's by rural and non-rural communities, and shows percent of the WAA's harvested by rural and non-rural communities. It is assumed that the 1987–1991 average deer harvest reflects rural and non-rural community use of deer in Project Area WAA's. ADF&G has collected deer harvest data for individual WAA's only since 1987. Averaging the deer harvest makes allowance for factors which influence deer numbers and hunting activity from year to year, such as weather patterns, access, habitat capability, and hunting success. Rural residents harvest 53–82 percent of the deer from all WAA's in the Project Area, for an average of 67 percent. Overall, non-rural residents harvest 33 percent of the deer from the Project Area WAA's; most of that non-rural harvest (97 percent) is from Ketchikan residents.

Deer are an important subsistence resource used by the rural communities in the vicinity of the CPOW Project Area. In Table 3-120 of this section, it is estimated that deer in WAA's 1319 and 1420 are currently being harvested at levels greater than the estimated habitat capability can sustain on a continued basis (assuming 10 percent harvest of the population is the maximum long-term sustainable level). The habitat capability for WAA's 1315, 1421, 1422, 1527, and 1530 is sufficient to meet current subsistence and sport hunting demands. The present habitat capability for all WAA's should be able to support the present level of subsistence harvest by rural communities.

Determining what harvest levels are sustainable assumes that habitat capability projections from the deer harvest model reflect an approximation of the deer population. Furthermore, it is based on the determination that the sustainable harvest is 10 percent of the deer population (Flynn and Suring 1989).

Table 3-119
Average Deer Harvest for 1987 through 1991, Project Area WAA's by Rural and Non-rural Communities

WAA	Rural	Non-rural	Total	% Rural	% Non-rural
1315	108	37	145	74	26
1319	244	52	296	82	18
1420	86	53	139	62	38
1421	141	125	266	53	47
1422	198	104	302	66	34
1527	19	13	32	59	41
1530	86	60	146	59	41
Total	882	444	1,326	67	33

SOURCE: Matson 1993. Data derived from ADF&G Deer Hunter Survey Summary Statistics 1987-1991.

A schematic map of Deer Demand as a Percentage of Deer Supply for Prince of Wales Island for 1990 is included in Appendix F.

Overall for all Project Area WAA's, the habitat capability of all action alternatives is at least 6,300 higher than the total deer needed from both rural and non-rural communities (Table 3-120). Habitat capability in WAA's 1319 and 1420 is already below what is necessary to sustain the current harvest levels. Alternative F5 reduces the habitat capability in WAA 1319 the most (from 2,857 down to 2,822). Alternative F6 decreases habitat capability the most in WAA 1420 (from 1253 down to 1223).

Table 3-120
Deer Populations Needed to Support Current Average Demand from Rural and Non-rural Communities Compared to Habitat Capability in 1996 (by alternative)

	Population Needed For			1993	1996 Habitat Capability by Alternative**						
WAA	Rural Harvest*	Non-rural Harvest*	Total Harvest*	Habitat Cap.**	1	1a	F2	F3	F4	F5	F6
1315	1,080	370	1,450	4,124	4,124	4,142	4,050	4,061	4,046	4,052	4,055
1319	2,440	520	2,960	2,857	2,857	2,857	2,827	2,834	2,830	2,822	2,829
1420	860	530	1,390	1,253	1,253	1,268	1,226	1,238	1,237	1,230	1,223
1421	1,410	1,250	2,660	3,172	3,172	3,172	3,143	3,128	3,148	3,145	3,137
1422	1,980	1,040	3,020	4,687	4,687	4,689	4,550	4,560	4,538	4,522	4,551
1527	190	130	320	1,815	1,815	1,815	1,815	1,814	1,814	1,814	1,815
1530	860	600	1,460	2,036	2,036	2,036	2,023	2,017	2,027	2,032	2,036
Total	8,820	4,440	13,260	19,944	19,944	19,961	19,634	19,652	19,640	19,617	19,646

* Harvest = number needed to meet demand.

** This habitat capability does not account for activites occurring in these WAA's outside of the Project Area, and the habitat capability is for the entire WAA's including other ownership.

SOURCE: Matson 1993. Data derived from ADF&G Hunter Survey Summary Statistics 1987-1991.

Deer: Reasonably Foreseeable Future Actions

Table 3-121 displays the effect of harvesting CPOW and other planned harvest activities taking place on Prince of Wales Island between now and the year 2004 (end of the Long-Term Contract with KPC). Table 3-121 also compares the deer habitat capability in 2004 to the 1991-95 ADF&G Deer Population Objectives for all the WAA's on Prince of Wales Island that are affected by proposed timber sales. Habitat capability meets or exceeds ADF&G Deer Population Objectives in WAA's 1107, 1211, 1212, 1213, 1214, 1316, 1323, 1332, and 1527. The habitat capability in 2004 is below ADF&G Deer Population Objectives in WAA's 1315, 1317, 1318, 1319, 1420, 1421, 1422, 1527, 1529, and 1530. All WAA's that are below the Population Objective still have a remaining habitat capability within 90 percent of the Objective.

ADF&G Deer Population Objectives for WAA's 1315, 1316, 1317, 1318, 1319, 1420, 1421, 1528, 1529, and 1530 have been set at the current habitat capability because of significant habitat reductions due to timber harvest or high hunting demand.

Table 3-121

Deer Habitat Capability Reductions on National Forest System Lands, by Project and WAA for Prince of Wales Island by 2004

	FS Lands		Habitat Capability Reduction, in Number of Deer					FS Lands	
WAA	Current Hab.Cap.	Polk DEIS Alt. 3	Lab Bay Alt. B	CPOW Alt. F5	CPOW Nxt Entry	Salt Lake EA Alt.3	Control L. Estimate	Hab.Cap. 2004	ADF&G Pop.Obj.
1107	6,915	- 1						6,914	5,275
1211	2,187							2,187	1,653
1212	1,362							1,362	1,024
1213	1,197	- 6						1,191	906
1214	1,749	- 18						1,731	1,450
1315	2,838			- 72	- 84			2,682	2,838
1316	827							827	827
1317	1,093	- 27						1,066	1,093
1318	1,796						- 33	1,763	1,796
1319	2,857			- 35	- 31		-165	2,626	2,857
1323	1,981					- 46	- 51	1,884	1,497
1332	2,805	- 11						2,764	2,292
1420	1,035			- 23	- 79			933	1,035
1421	3,073			- 27	-170		- 41	2,876	3,073
1422	4,412			-165	- 99			4,148	4,288
1527	1,730		- 40	- 1	- 14			1,675	1,520
1528	378		- 11					367	378
1529	2,501		- 63					2,438	2,501
1530	1,861		- 41	- 4	- 50			1,766	1,861
TOTAL	42,597	- 63	-3215	-527	- 46	-290	41,200	38,164	

* Current habitat capability is assumed to be the same as that listed in TLMP Revision for 1990.
SOURCE: Matson 1993. Data derived from ADF&G Hunter Survey Summary Statistics 1987-1990.

Table 3-122 compares projected deer populations needed to support demand from both rural and non-rural communities with the estimated habitat capability in the year 2040.

Table 3-122

Deer Populations Needed to Support Demand from Rural and Non-rural Communities Compared to Habitat Capability in 2040

WAA	Population Needed For: Rural Demand *	Non-rural Demand *	Total Demand *	1993 Habitat Cap.**	2040 Habitat Cap.***
1315	1,810	740	2,550	4,124	4,056
1319	4,290	640	4,930	2,857	2,534
1420	1,710	1,200	2,910	1,253	1,088
1421	2,620	2,560	5,180	3,172	2,621
1422	3,260	2,420	8,940	4,687	4,315
1527	1,170	990	2,160	1,815	1,719
1530	1,470	940	2,410	2,036	1,876
Total	16,330	9,490	25,820	19,944	18,209

SOURCE: Matson 1993. Data derived from ADF&G Hunter Survey Summary Statistics 1987-1991.
* Demand was determined by increasing current harvest levels 1.8 percent per year through 2010 and 1.5 percent per year for the period 2010 to 2040.
** This habitat capability includes estimated habitat capability occurring in the total WAA, including other ownership and outside the CPOW Project Area.
*** Reasonably Foreseeable Future Actions. This habitat capability includes estimated habitat capability occurring in the total WAA, including other ownership and outside the CPOW Project Area.

Figures 3-49 through 3-55 display the cumulative effect of timber harvest activity on the deer supply available for harvest through the year 2040 as compared to the demand for deer. The current demand for deer is assumed to be the average deer harvest from 1987–91 for each Project Area WAA. To determine future demand for deer, the current demand was increased by 1.8 percent per year though the year 2010 and 1.5 percent per year from 2010 to the year 2040.

Rural demand for deer will probably be met in the year 2040 in WAA's 1315, 1422, 1527, and 1530. If current assumptions are correct, by the year 2040 total rural demand will not be met in WAA's 1319, 1420, and 1421. Deer supply is the least in WAA's 1319, 1420, and 1421. WAA 1315 comes closest to meeting rural and non-rural demand in the year 2040.

A schematic map of Projected Deer Demand as a Percentage of Deer Supply on Prince of Wales Island for 2040 is included in Appendix F.

Figure 3-49
Estimated Deer Availability and Demand in WAA 1315

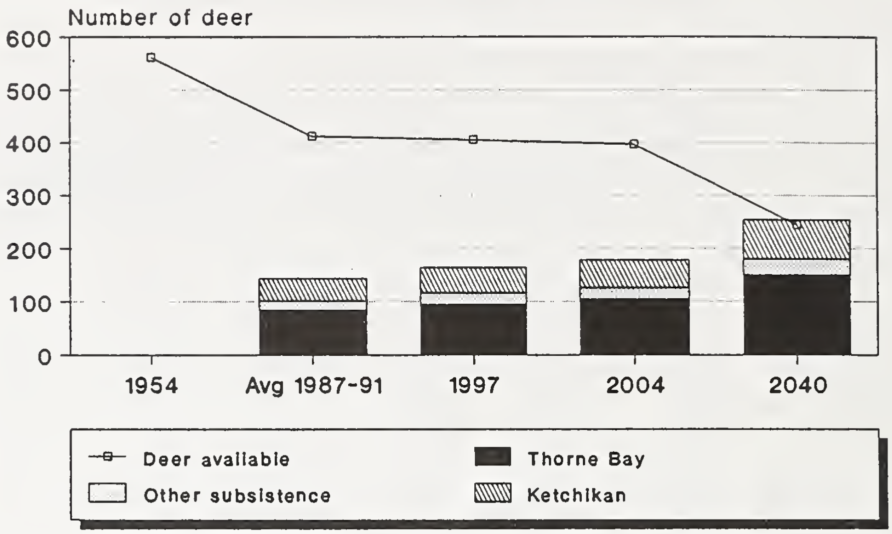


Figure 3-50
Estimated Deer Availability and Demand in WAA 1319

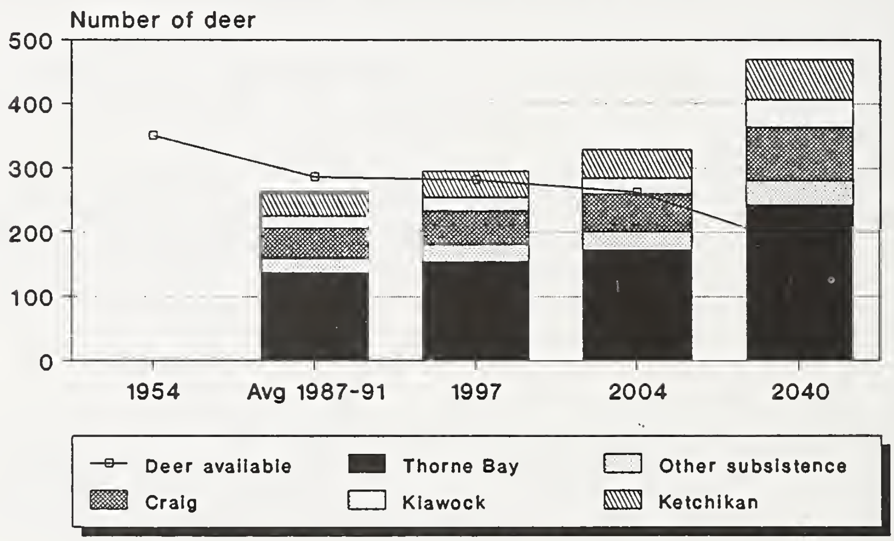


Figure 3-51
Estimated Deer Availability and Demand in WAA 1420

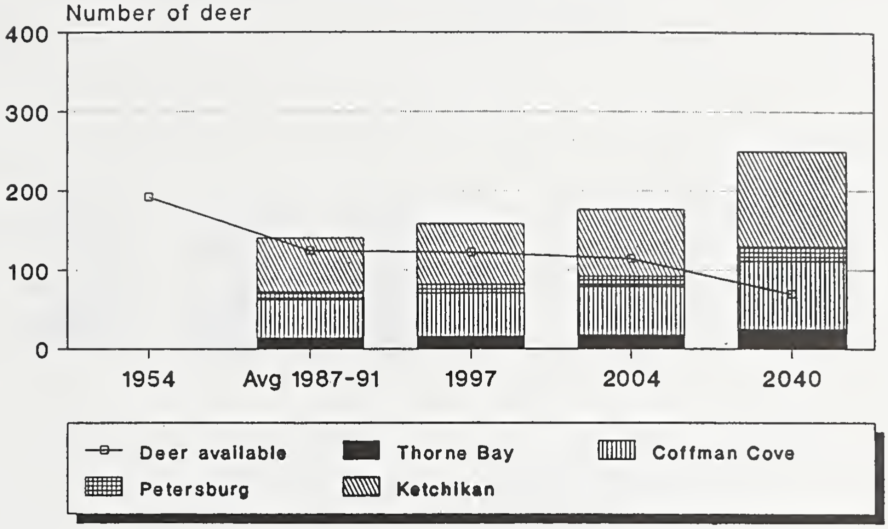


Figure 3-52
Estimated Deer Availability and Demand in WAA 1421

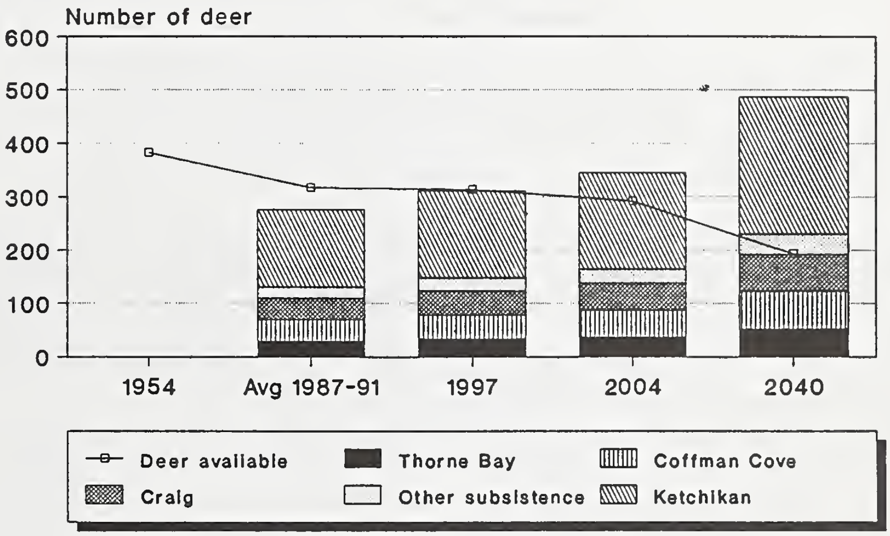


Figure 3-53
Estimated Deer Availability and Demand in WAA 1422

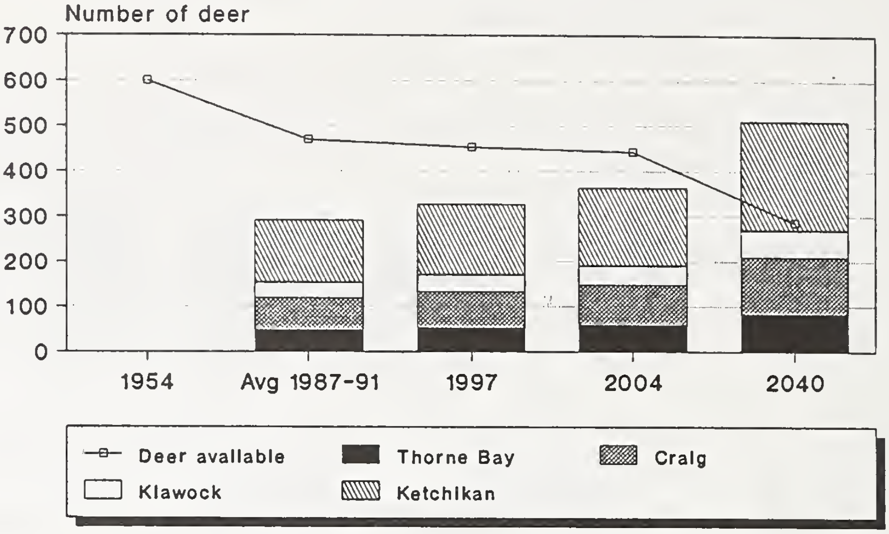


Figure 3-54
Estimated Deer Availability and Demand in WAA 1527

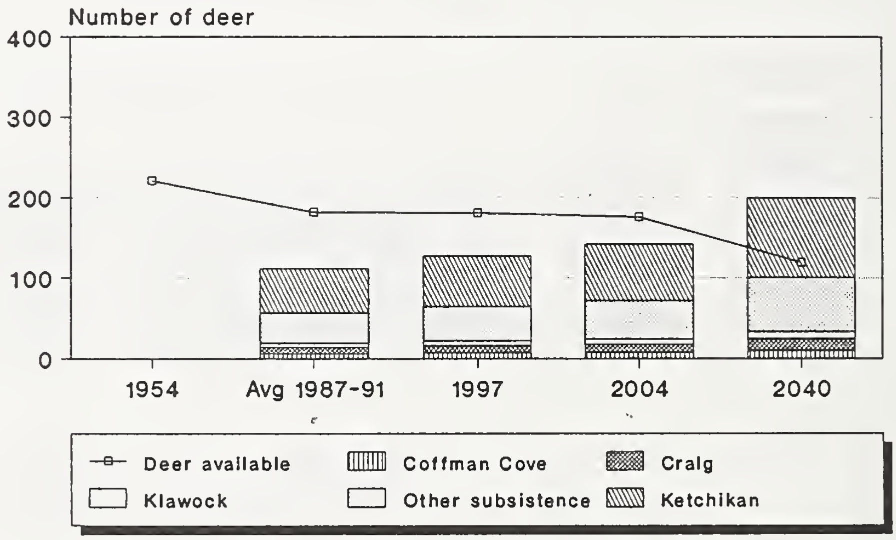
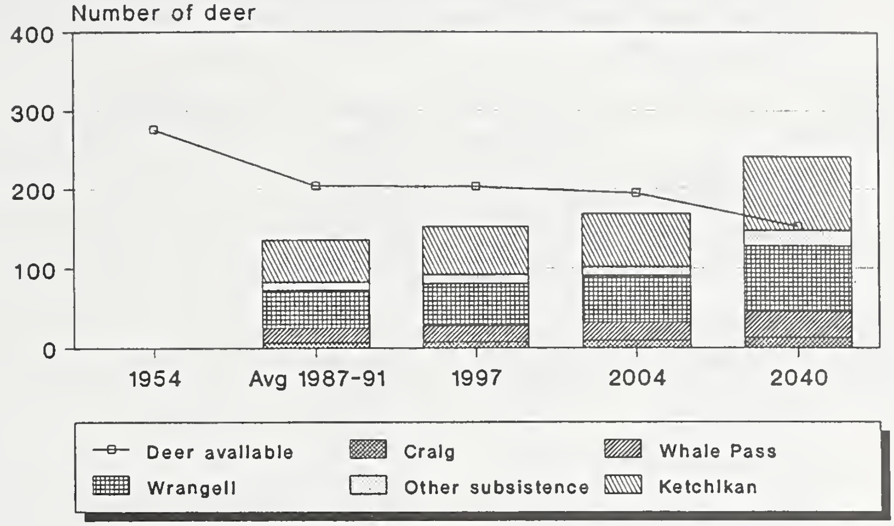


Figure 3-55
Estimated Deer Availability and Demand in WAA 1530



Deer: Community Analyses

A measure of the relative impact by alternative to subsistence uses can be ranked by totaling the acres proposed for harvest that are used for subsistence by more than 15 percent of community households, Table 3-123. The resulting ranking, from lowest impact to highest impact, by alternative is: 1/1a, F4, F6, F5, F3, and F2, although all are fairly similar in the amount of acreage affected (5,456 to 5, 851 acres).

The following sections are organized by community. They draw on four types of data presentations: (1) percent of the community's deer harvest that occurred within the Project Area WAA's; (2) tables with analyses of changes in land used for subsistence; (3) figures comparing the projected number of deer available for harvest in Project Area Wildlife Analysis Areas under proposed actions against projected demand for deer to the year 2040 (Figures 3-56 through 3-64 compare cumulative changes in deer supply and demand for areas which currently contribute 90 percent of the deer harvested by a community); and (4) the habitat capability of WAA's used by each community taking into account impacts from the proposed alternatives.

The first type of data is the percent of community deer harvest that occurs within the Project Area WAA's (Table 3-113, earlier in this section).

The second type of data presentation displays the amount of acreage overlapping between proposed cutting units and new road construction, and areas used for subsistence deer hunting by more than 15 percent of the households in a given community. Table 3-123 summarizes the analysis done for each community, based on maps with detailed analyses for each community which are located in Appendix F.

Table 3-123

Acreage Used by More than 15 percent of Rural Community Households for Deer Hunting, and Acres Proposed for Timber Harvest or Road Construction, by Alternative and Community

Rural Community	Acres Used by Community Households	Acres Cut or Roaded	1	1a	F2	F3	F4	F5	F6
			Acreage Proposed for Harvest or Road Construction by Alternative						
Coffman Cove	37,528	12,096	0	0	1,246	1,260	1,039	1,247	1,540
Craig	34,582	17,229	0	0	1,130	1,249	1,237	1,311	1,213
Hollis	69	61	0	0	0	0	0	0	0
Hydaburg	850	163	0	0	114	96	128	161	143
Kasaan	4,179	646	0	0	7	57	57	37	7
Klawock	44,435	20,918	0	0	1,413	1,591	1,522	1,565	1,447
Petersburg	0	0	0	0	0	0	0	0	0
Point Baker	0	0	0	0	0	0	0	0	0
Port Protection	380	257	0	0	0	0	0	0	0
Thorne Bay	35,579	17,739	0	0	983	1,020	936	931	969
Whale Pass	9,630	3,696	0	0	701	505	537	507	334
Wrangell	0	0	0	0	0	0	0	0	0
Total			0	0	5,851	5,778	5,456	5,759	5,653

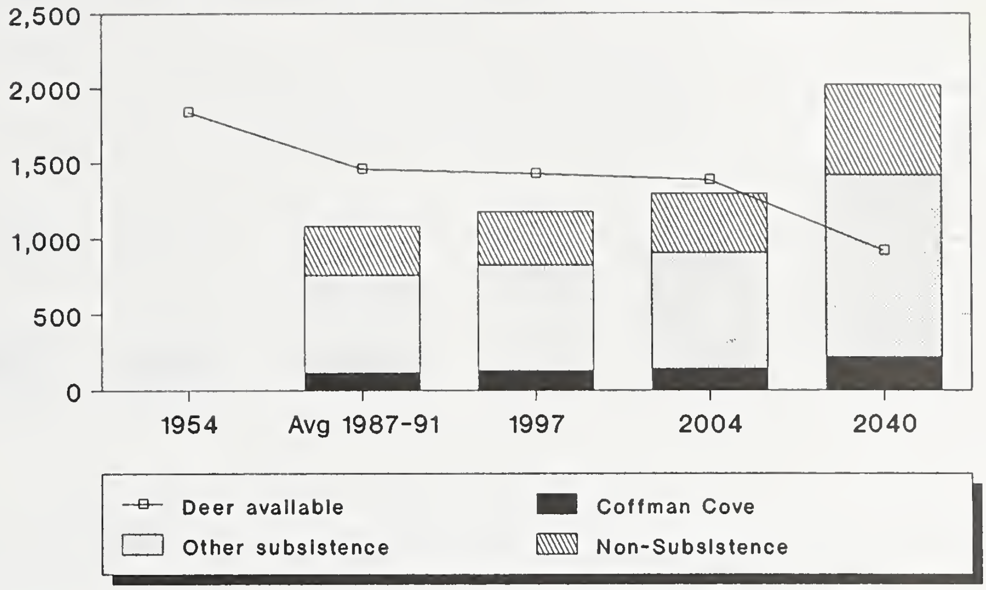
SOURCE: Matson 1993. Derived from TRUCS data base using GIS.

The third type of data presentation compares the estimated supply and demand for deer for the area from which a particular community currently harvests 90 percent of its total deer harvest. These figures show: (1) the estimated effects on the area's ability to support deer populations as the TLMP Draft Revision is implemented; and (2) the estimated demand for deer for the same area, assuming demand increases the same as the population is projected to increase in Southeast Alaska. (Harvest numbers in GMU 2 have been fairly constant since a peak in 1987; see Figure 3-23 in the Wildlife section of this chapter.) Figures 3-56 through 3-64 help answer the question of whether the cumulative effects of past activities, proposed actions, and TLMP Draft Revision will reduce the number of deer available at a number below subsistence demands in each community's primary use area. The communities of Petersburg, Point Baker, and Port Protection were not analyzed in this manner due to the limited use of the Project Area for deer hunting (5 percent or less of the deer harvest by these communities occurred within the Project Area WAA's, Table 3-111).

The fourth type of information considered is the habitat capability of WAA's used by each community for harvesting deer, after the impacts of the proposed alternatives (Table 3-120). This represents the immediate impacts of these alternatives.

Coffman Cove

Figure 3-56
Deer Supply and Demand in all areas used by Coffman Cove Residents

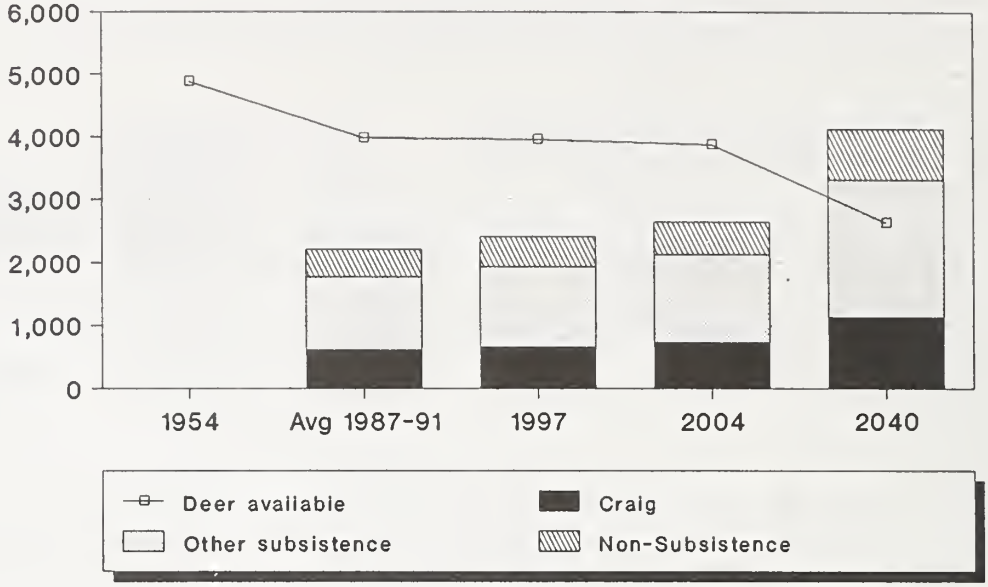


SOURCE: Matson 1993. Based on ADF&G Deer Harvest Data, 1987-91, sorted by WAA and Community, summarized by WAA, ADF&G Division of Subsistence, January 1993.
NOTE: This analysis was conducted only for those WAA's that accounted for 90 percent of the total deer harvest for this community (WAA's 1319, 1420, 1421, 1422, 1527, 1906). Deer Supply was calculated using 10 percent of the estimated deer habitat capability, as recommended by Flynn and Suring (1989).

Seventy-nine percent of Coffman Cove's deer came from the Project Area WAA's between 1987 and 1991. Figure 3-56 shows that there is an adequate number of deer to meet the current rural and non-rural demand for deer now and through the year 2004. With implementation of the preferred alternative of the TLMP Draft Revision and a projected increase in demand for deer, at some point in the future it may be necessary to restrict non-rural harvest of deer and give the rural communities preference. With the projected increase in demand, by the year 2040 there may not even be enough deer supply to meet all of the projected subsistence demand. Table 3-123 shows that the action alternatives will harvest between 1,039 and 1,540 acres of land used by at least 15 percent of the Coffman Cove households. Table 3-120 shows that current habitat capability in WAA's 1319 and 1420 might not be able to sustain the current harvest level, and all action alternatives will further lower the habitat capability for deer. Both WAA's 1319 and 1420 are used by Coffman Cove residents.

Based on the amount of the Project Area used by Coffman Cove residents for deer hunting, the habitat capability of WAA's 1319 and 1420, and the fact that at some point in the future it may be necessary to restrict the non-rural harvest of deer, there is a significant possibility of a significant restriction of the subsistence use of deer by Coffman Cove residents associated with all proposed alternatives, including the no-action alternatives.

Figure 3-57
Deer Supply and Harvest in All Areas Used by Craig Residents



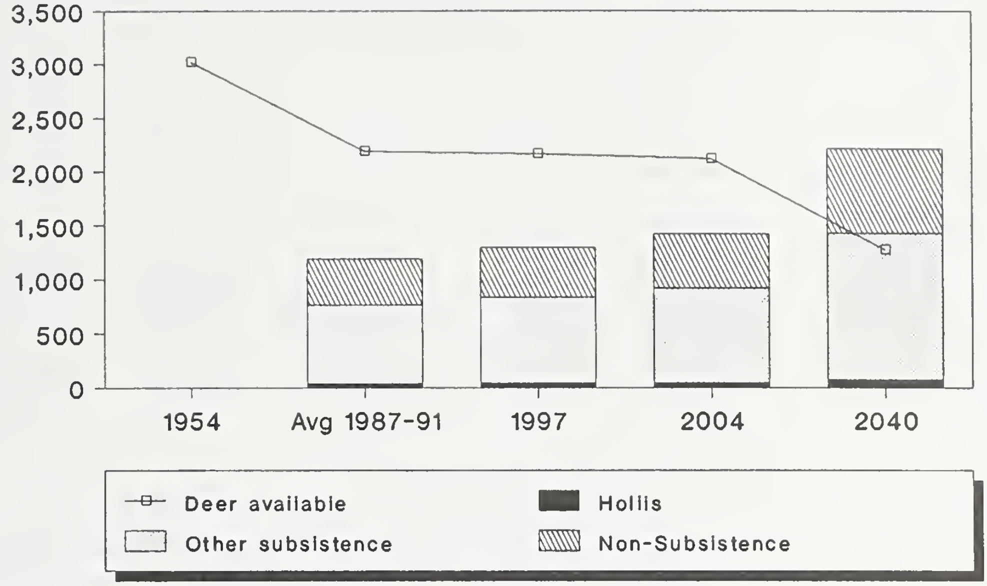
SOURCE: Matson 1993. Based on ADF&G Deer Harvest Data, 1987-91, sorted by WAA and Community, summarized by WAA, ADF&G Division of Subsistence, January 1993.
NOTE: This analysis was conducted only for those WAA's that accounted for 90 percent of the total deer harvest for this community (WAA's 901, 902, 1003, 1316, 1317, 1318, 1319, 1323, 1332, 1421, 1422, 1529, and 1531). Deer Supply was calculated using 10 percent of the estimated deer habitat capability, as recommended by Flynn and Suring (1989).

Twenty-nine percent of Craig's deer came from the Project Area WAA's between 1987 and 1991. Figure 3-57 shows that there is an adequate number of deer to meet the current rural and non-rural hunting demand for deer now and through the year 2004. With implementation of the preferred alternative of TLMP Draft Revision and with projected increases in demand for deer, at some point in the future it may be necessary to restrict the non-rural harvest of deer. Table 3-123 shows that the action alternatives will harvest between 1,130 and 1,311 acres of land used by at least 15 percent of the Craig households. The habitat capability in WAA 1319 (Table 3-120) is below the recommended level to sustain current harvest levels. All alternatives reduce the habitat capability in WAA 1319, which is used by Craig residents.

Based on the amount of the Project Area used by Craig residents for deer hunting, the habitat capability in WAA 1319, and the fact that at some point in the future it may be necessary to restict the non-rural harvest of deer, there is a significant possibility of a significant restriction of the subsistence use of deer by Craig residents associated with all proposed alternatives, including the no-action alternatives.

Hollis

Figure 3-58
Deer Supply and Harvest in All Areas Used by Hollis Residents

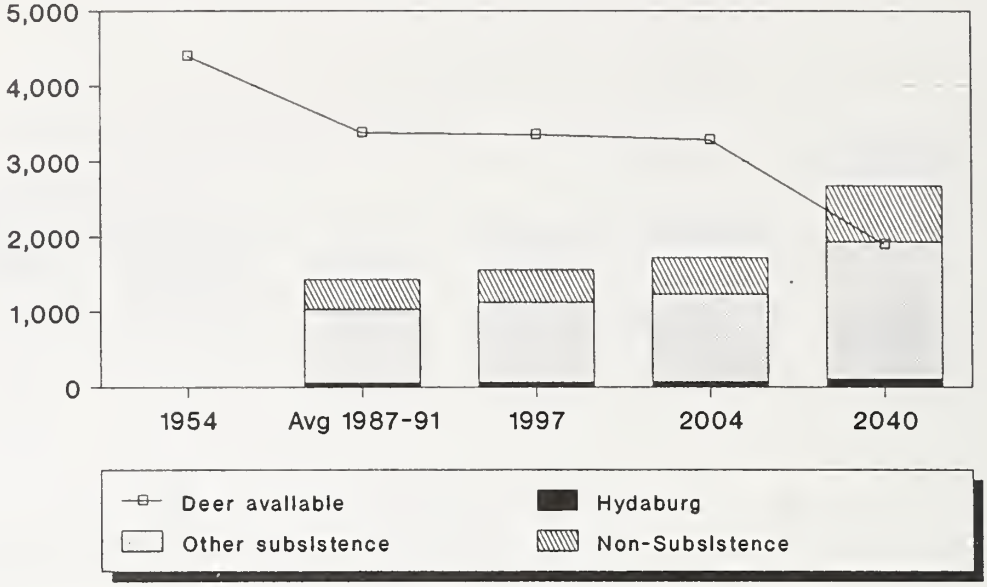


SOURCE: Matson 1993. Based on ADF&G Deer Harvest Data, 1987-91, sorted by WAA and Community, summarized by WAA, ADF&G Division of Subsistence, January 1993.
NOTE: This analysis was conducted only for those WAA's that accounted for 90 percent of the total deer harvest for this community (WAA's 1211, 1315, 1317, 1318, 1420, 1421,and 1422). Deer Supply was calculated using 10 percent of the estimated deer habitat capability, as recommended by Flynn and Suring (1989).

Fifty percent of Hollis's deer came from the Project Area WAA's between 1987 and 1991. Figure 3-58 shows that there is an adequate number of deer to meet the current rural and non-rural demand for deer now and through the year 2004. With implementation of the preferred alternative of TLMP Draft Revision and a projected increase in demand for deer, at some point in the future it may be necessary to restrict the non-rural harvest of deer and give the rural communities preference. Table 3-123 shows that the action alternatives will not harvest any land used by at least 15 percent of the Hollis households. Table 3-120 shows that current habitat capability in WAA 1420 might not be able to sustain the current harvest level, and all action alternatives will further lower the habitat capability for deer. All alternatives will further reduce the habitat capability in WAA 1420 below the recommended level to sustain the current harvest level.

Based on the amount of the Project Area used by Hollis residents for deer hunting, the habitat capability of WAA's 1420, and the fact that at some point in the future it may be necessary to restrict the non-rural hunting of deer, there is a significant possibility of a significant restriction of the subsistence use of deer by Hollis residents associated with all proposed alternatives, including the no-action alternatives.

Figure 3-59
Deer Supply and Harvest in all Areas Used by Hydaburg Residents



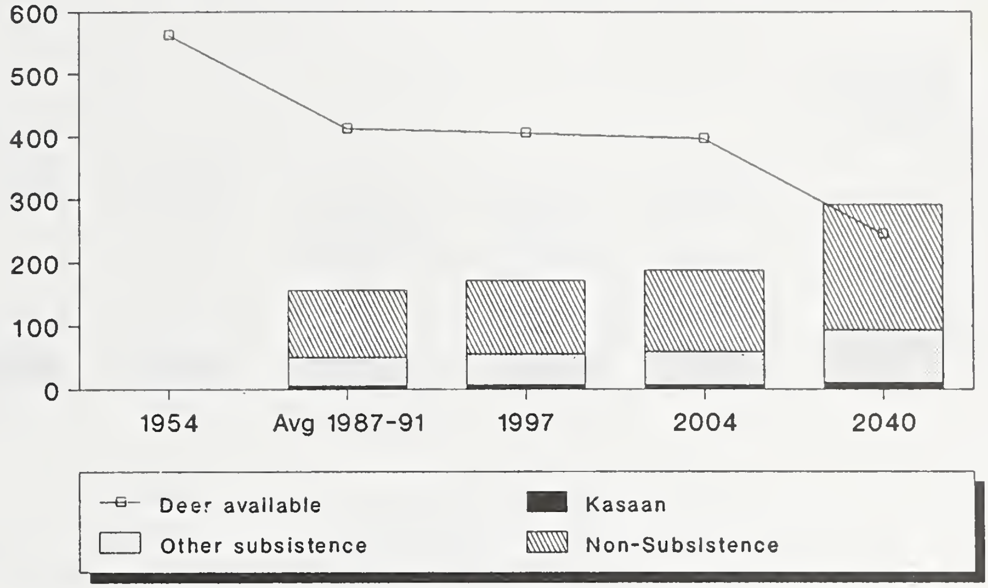
SOURCE: Matson 1993. Based on ADF&G Deer Harvest Data, 1987-91, sorted by WAA and Community, summarized by WAA, ADF&G Division of Subsistence, Jnauary 1993.
NOTE: This analysis was conducted only for those WAA's that accounted for 90 percent of the total deer harvest for this community (WAA's 901, 1107, 1316, 1317, 1318, 1319, 1332, 1420, 1421, and 1422). Deer Supply was calculated using 10 percent of the estimated deer habitat capability, as recommended by Flynn and Suring (1989).

Thirty-five percent of Hydaburg's deer came from the Project Area WAA's between 1987 and 1991. Figure 3-59 shows that there is an adequate number of deer to meet the current rural and non-rural hunting demand for deer now and through the year 2004. With implementation of the preferred alternative of TLMP Draft Revision and a projected increase in the demand for deer, at some point in the future it may be necessary to restrict the non-rural harvest of deer. Table 3-123 shows that the action alternatives will harvest between 96 and 161 acres of land used by at least 15 percent of the Hydaburg households. The habitat capability in WAA's 1319 and 1420 (Table 3-120) may already be below the level necessary to sustain current harvest levels, and action alternatives will reduce the habitat capability further. WAA's 1319 and 1420 are used by Hydaburg residents.

Based on the amount of the Project Area used by Hydaburg residents for deer hunting, the habitat capability in WAA's 1319 and 1420, and the fact that at some point in the future it may be necessary to restrict the non-rural hunting of deer, there is a significant possibility of a significant restriction of the subsistence use of deer by Hydaburg residents associated with all proposed alternatives, including the no-action alternatives.

Kasaan

Figure 3-60
Deer Supply and Harvest in all Areas Used by Kasaan Residents

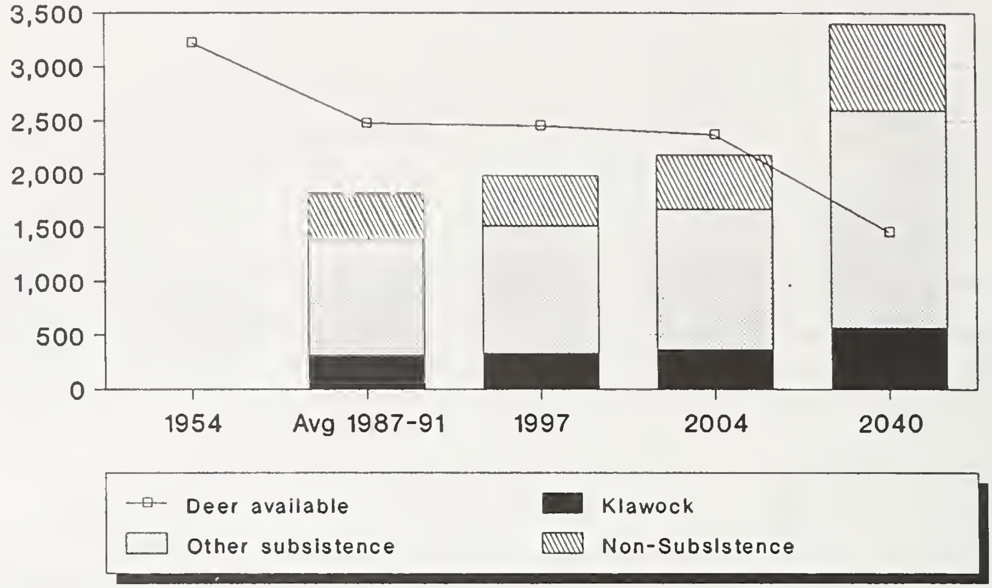


SOURCE: Matson 1993. Based on ADF&G Deer Harvest Data, 1987-91, sorted by WAA and Community, summarized by WAA, ADF&G Division of Subsistence, January 1993.
NOTE: This analysis was conducted only for those WAA's that accounted for 90 percent of the total deer harvest for this community (WAA 1315). Deer Supply was calculated using 10 percent of the estimated deer habitat capability, as recommended by Flynn and Suring (1989).

One hundred percent of Kasaan's deer came from the Project Area WAA's between 1987 and 1991. Figure 3-60 shows that there is an adequate number of deer to meet the current rural and non-rural demand for deer now and through the year 2004. With implementation of the preferred alternative of TLMP Draft Revision and projected increase in demand for deer, at some point in the future it may be necessary to restrict the non-rural harvest of deer. Table 3-123 shows that the action alternatives will harvest between 7 and 57 acres of land used by at least 15 percent of the Kasaan households. WAA 1315 has habitat capability in excess of total demand for deer.

Based on the amount of harvest planned in areas used by Kasaan residents for deer hunting, and the surplus of deer habitat capability in WAA 1315, there is no significant possibility of a significant restriction of the subsistence use of deer by Kasaan residents associated with the proposed action alternatives.

Figure 3-61
Deer Supply and Harvest in All Areas Used by Klawock Residents



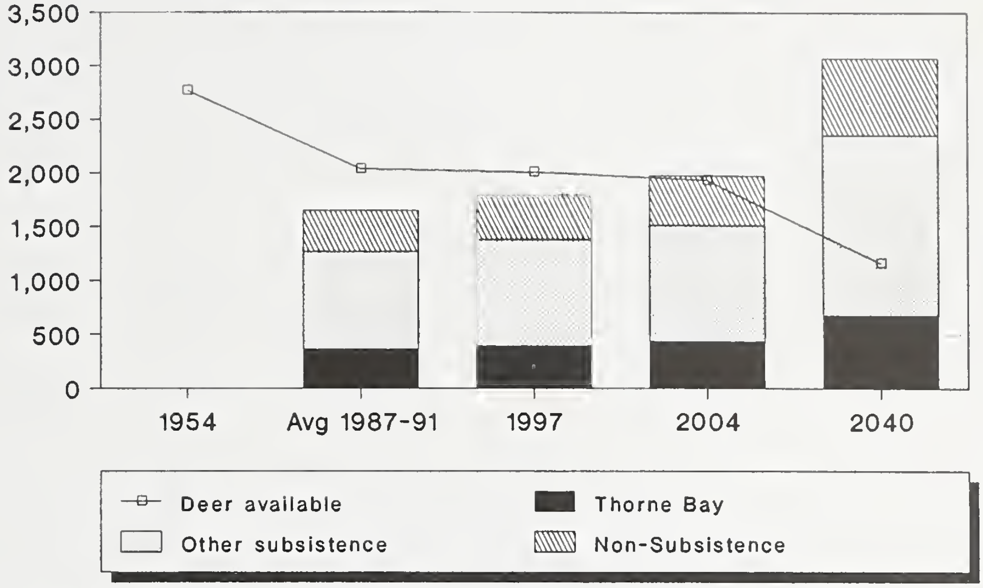
SOURCE: Matson 1993. Based on ADF&G Deer Harvest Data, 1987-91, sorted by WAA and Community, summarized by WAA, ADF&G Division of Subsistence, January 1993.
NOTE: This analysis was conducted only for those WAA's that accounted for 90 percent of the total deer harvest for this community (WAA's 901, 1317, 1318, 1319, 1323, 1420, 1421, 1422 and 1529). Deer Supply was calculated using 10 percent of the estimated deer habitat capability, as recommended by Flynn and Suring (1989).

Thirty-four percent of Klawock's deer came from the Project Area WAA's between 1987 and 1991. Figure 3-61 shows that there is an adequate number of deer to meet the current rural and non-rural demand for deer now and through the year 2004. With implementation of the preferred alternative of TLMP Draft Revision and a projected increase in demand for deer, at some point in the future it may be necessary to restrict the non-rural harvest of deer and give the rural communities preference. Table 3-123 shows that the action alternatives will harvest between 1,447 and 1,670 acres of land used by at least 15 percent of the Klawock households. Table 3-120 shows that current habitat capability in WAA's 1319 and 1420 might not be able to sustain the current total harvest level and all action alternatives will further lower the habitat capability for deer. Both WAA 1319 and 1420 are used by Klawock residents.

Based on the amount of the Project Area used by Klawock residents for deer hunting, the habitat capability of WAA's 1319 and 1420, and the fact that at some point in the future it may be necessary to restrict the non-rural hunting of deer, there is a significant possibility of a significant restriction of the subsistence use of deer by Klawock residents associated with all proposed alternatives.

Thorne Bay

Figure 3-62
Deer Supply and Harvest in All Areas Used by Thorne Bay Residents

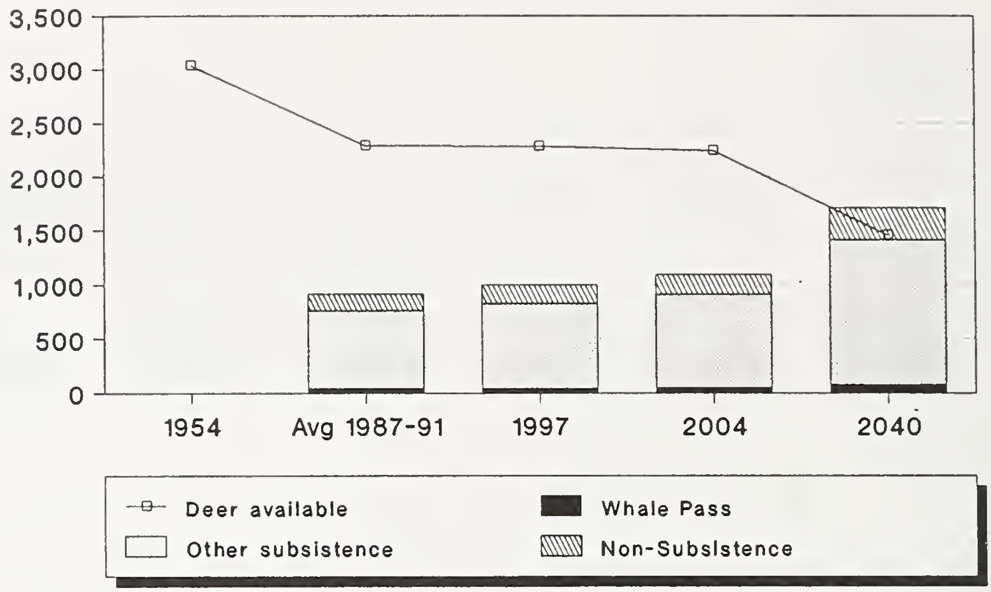


SOURCE: Matson 1993. Based on ADF&G Deer Harvest Data, 1987-91, sorted by WAA and Community, summarized by WAA, ADF&G Division of Subsistence, January 1993.
NOTE: This analysis was conducted only for those WAA's that accounted for 90 percent of the total deer harvest for this community (WAA's 1315, 1318, 1319, 1420, 1421, and 1422). Deer Supply was calculated using 10 percent of the estimated deer habitat capability, as recommended by Flynn and Suring (1989).

Eighty-four percent of Thorne Bay's deer came from the Project Area WAA's between 1987 and 1991. Figure 3-62 shows that there is not an adequate number of deer to meet the current rural and non-rural demand for deer now and through the year 2004. Before the end of the Long-Term Contract in 2004, it may be necessary to restrict the non-rural harvest of deer in order to give rural communities priority. Table 3-123 shows that the action alternatives will harvest between 931 and 1,020 acres of land used by at least 15 percent of the Thorne Bay households. The habitat capability in WAA's 1319 and 1420 (Table 3-120) is already below the recommended level to sustain the current level of total harvest and is further reduced by all action alternatives. WAA's 1319 and 1420 are used by Thorne Bay residents.

Based on the amount of the Project Area used by Thorne Bay residents for deer hunting, the possible restrictions to non-rural hunting of deer, and the habitat capability in WAA's 1319 and 14210 there is a significant possibility of a significant restriction of the subsistence use of deer by Thorne Bay residents associated with all proposed alternatives, including the no-action alternatives.

Figure 3-63
Deer Supply and Harvest in All Areas used by Whale Pass Residents



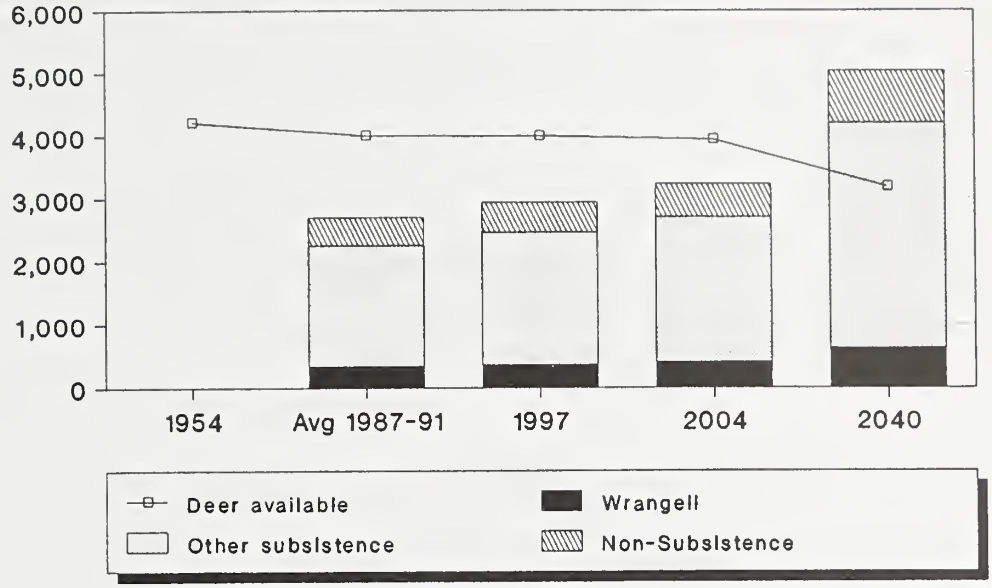
SOURCE: Matson 1993. Based on ADF&G Deer Harvest Data, 1987-91, sorted by WAA and Community, summarized by WAA, ADF&G Division of Subsistence, January 1993.
NOTE: This analysis was conducted only for those WAA's that accounted for 90 percent of the total deer harvest for this community (WAA's 1107, 1318, 1319, 1527, 1529 and 1530). Deer Supply was calculated using 10 percent of the estimated deer habitat capability, as recommended by Flynn and Suring (1989).

Sixty-nine percent of Whale Pass's deer came from the Project Area WAA's between 1987 and 1991. Figure 3-63 shows that there is an adequate number of deer to meet the current rural and non-rural hunting demand for deer now and through the year 2004. With implementation of the preferred alternative of TLMP Draft Revision and a projected increase in demand for deer, at some point in the future it may be necessary to restrict the non-rural harvest of deer. Table 3-123 shows that the action alternatives will harvest between 334 and 701 acres of land used by at least 15 percent of the Whale Pass households. The habitat capability in 1319 (Table 3-120) may already be reduced below the level necessary to sustain current total harvest levels.

Based on the amount of the Project Area used by Whale Pass residents for deer hunting that is proposed for harvest, and the projected increase in demand for deer where Whale Pass residents hunt deer, there is a significant possibility of a significant restriction of the subsistence use of deer by Whale Pass residents associated with the proposed action alternatives.

Wrangell

Figure 3-64
Deer Supply and Harvest in all Areas used by Wrangell Residents



SOURCE: Matson 1993. Based on ADF&G Deer Harvest Data, 1987-91, sorted by WAA and Community, summarized by WAA, ADF&G Division of Subsistence, January 1993.
NOTE: This analysis was conducted only for those WAA's that accounted for 90 percent of the total deer harvest for this community (WAA's 1319, 1420, 1526, 1527, 1528, 1529, 1530, 1901, 1903, 1904, 1905, 1906, 1910, 3001, 3313, 3733, 3734, and 3938). Deer Supply was calculated using 10 percent of the estimated deer habitat capability, as recommended by Flynn and Suring (1989).

Nineteen percent of Wrangell's deer came from the Project Area between 1987 and 1991. Figure 3-64 shows that there is adequate deer available to meet current level of harvest for rural and non-rural resident use through the year 2004. With in implementation of the preferred alternative in the TLMP Draft Revision and a projected increase in demand for deer, at some point in the future it may be necessary to restrict the harvest of deer by non-rural residents in areas used by Wrangell residents. Table 3-123 shows that there are 0 acres of land proposed for harvest where more than 15 percent of Wrangell residents harvest deer.

Based on the lack of projected direct effects on Wrangell deer harvesting in the Project Area, there is no significant possibility of a significant restriction of subsistence use of deer by Wrangell residents associated with the proposed action alternatives.

Deer: Access

Access to traditional subsistence-use areas may be affected where logging activities take place near the beach fringe, because traditional subsistence access is by boat to the beaches of the Project Area. The effect on access would probably be minor under all alternatives since no beach fringe would harvested in the Project Area and no marine or estuarine habitat would be directly affected by logging activities.

New and rebuilt roads would provide access to areas that were not previously used for subsistence harvest of deer. Miles of road proposed for construction are shown in Figure 2-5, in Chapter 2. Road access would favor harvest by residents who live in communities connected to the road system or who bring a vehicle to Prince of Wales Island on the ferry.

Road closures and other management prescriptions developed for Project Area roads would be the same as those specified in Option B in the 1989-94 LTS EIS.

It is not anticipated that access to deer would be significantly affected by the proposed project. Roads closed to vehicle travel would still be open for foot traffic, and while the project may affect someone's particular hunting area, numerous other places are still available to harvest deer.

Deer: Competition

Competition for subsistence resources in the CPOW Project Area is an issue to residents of Prince of Wales Island. Residents are concerned with competition from residents of Ketchikan, mostly because of the numbers of people that come to the island via the ferry. Since Ketchikan residents are considered non-rural, this competition can be regulated if it starts to restrict rural residents' ability to obtain subsistence resources.

Table 3-111, earlier in this section, shows the distribution of deer harvest in Project Area WAA's among rural and non-rural communities. Data indicate there is competition with non-rural hunters. Over 40 percent of the deer are harvested by non-rural hunters in WAA's 1421, 1527 and 1530 (Table 3-119). This reflects competition by Ketchikan residents. Deer habitat capability in WAA's 1319 and 1420 are presently below the level considered adequate to sustain current rural and non-rural harvest. Deer habitat capability in all WAA's is presently adequate to support current rural harvest for deer (Table 3-120).

The Federal Subsistence Board may use its authority to regulate non-rural harvest of deer, and has authority to prioritize the harvest of deer among rural residents when necessary to protect the resource. This type of action, as prescribed by ANILCA, Section 804, may be necessary to ensure the availability of adequate abundance of deer needed by the rural communities using the Project Area whether or not the proposed actions are implemented. The current deer population level may require restrictions on non-rural users.

Individual household use of specific areas may be displaced by some of the proposed actions. There is not sufficient information available nor would it be practical to evaluate displacement potential for individual households. The transportation system available for rural residents to use for harvesting deer makes it very unlikely that an individual household or even an entire community would need to rely exclusively on specific areas within the Project Area that may be affected by proposed alternatives.

The known uses of the Project Area by individual communities is discussed earlier in this section.

Because there may be a future displacement of subsistence use of deer, Figures 3-56 through 3-64, earlier in this section, display the availability of deer within the area used by specific communities. The evaluation indicates that for most communities there is adequate deer abundance within the area historically used by residents of each community to meet subsistence needs. Based on Table 3-122 and Figures 3-49 through 3-55 (earlier in this section), sometime before 2040, habitat capabilities in WAA's 1319, 1420 and 1421 may not meet the projected demand. This may lead to the displacement of some households of the communities that use these WAA's. This would include the communities of Coveman Cove, Craig, Hydaburg, Klawock, Petersburg, and Thorne Bay. Any displacement that may occur is likely to be to other areas within a household's or community's historical range.

Deer: Cumulative Impacts

Cumulative impacts of CPOW Alternatives are determined by calculating the effect on habitat capability after regeneration in clearcut units enters the closed canopy stage and shades out understory plants and forbs. The cumulative impacts for the reasonably foreseeable future timber harvest is displayed in Table 3-122 (earlier in this section) as compared to the demand for deer in 2040. The demand for deer in 2040 was calculated by using Alaska Dept. of Labor population projections with the assumption that demand will increase at the same rate of population increase. A 1.8 percent per year population increase was used through the year 2010, and 1.5 percent per year population increase was used from 2010 to 2040.

The projected number of deer available for harvest in the year 2040 should be sufficient to meet the projected demand for both rural and non-rural hunters in WAA's 1315. The projected number of deer available for harvest will only be sufficient to meet projected rural demands in WAA's 1421, 1422, 1527 and 1530.

Deer: Summary of Findings for Subsistence Use

One or more of the proposed actions may have a significant possibility of a significant restriction of subsistence use of Sitka black-tailed deer by the residents of Coffman Cove, Craig, Hollis, Hydaburg, Klawock, and Thorne Bay (see Table 3-124).

The total habitat capability from all Project Area WAA's is sufficient to meet the current demand from all subsistence communities that harvest deer from the Project Area. However, future reductions in habitat capability and increased demand for deer will exacerbate the potential conflict between rural resident and non-rural resident harvest of deer in the Project Area. In addition, to be successful, hunters may need to make changes from their past hunting techniques or location or time of hunt. These possibilities reinforce the conclusion that the subsistence use of deer in the Project Area may be significantly restricted in the future.

Much of the private land adjacent to the Project Area is owned by Native corporations, and much of that land has had the timber harvested. The analysis for deer included these lands in the analysis. The habitat capability for these lands was estimated for before harvest occurred (1954), the existing condition, and what the habitat capability would be after all the productive forest land is harvested and the second growth is in the closed canopy stage.

Table 3-124
Significant Possibility of a Significant Restriction of Subsistence Use of Sitka Black-tailed Deer

Community	Significant Possibility of Restriction by Alternative 1	1a	F2	F3	F4	F5	F6
Abundance or Distribution							
Coffman Cove	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Craig	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Hollis	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Hydaburg	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Kasaan	No	No	No	No	No	No	No
Klawock	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Petersburg	No	No	No	No	No	No	No
Point Baker	No	No	No	No	No	No	No
Port Protection	No	No	No	No	No	No	No
Thorne Bay	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Whale Pass	Yes	Yes	Yes	Yes	Yes	Yes	No
Wrangell	No	No	No	No	No	No	No
Access							
All communities	No	No	No	No	No	No	No
Competition							
All communities	No	No	No	No	No	No	No

SOURCE: Matson 1993.
Note: "No" indicates an insignificant possibility of a substantial effect. "Yes" indicates a significant possibility of a substantial effect.

Direct, Indirect, and Cumulative Effects on Other Resources

Other Resources: Abundance and Distribution

Furbearers. Furbearers are presently being trapped in the Project Area (Tables 3-116 and 3-117). This evaluation assumes most of the trappers are from the surrounding rural communities.

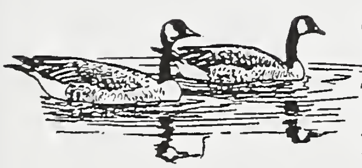
Past timber harvest in the Project Area reduced marten habitat capability from 671 to 499, which is a 26 percent reduction (Table 3-62, in the Wildlife section of this chapter). Marten habitat capability is assumed to reflect potential marten abundance and furbearer abundance. The Wildlife analysis in this chapter indicates that the proposed timber harvest would potentially reduce marten habitat capability approximately 4 percent.

Table 3-116 earlier in this section indicates that the 1990 marten abundance is sufficient to sustain the 1984 to 1990 average harvest of 575 martens. In fact, there is habitat capable of supporting at least 890 martens. With a 4 percent reduction of the current habitat capability, there will still be sufficient numbers of martens to sustain the average harvest under any alternative. However, roads left open for public use during trapping season may further decrease marten populations.

Past timber harvest in the Project Area reduced otter habitat capability from 192 to 168, which is reduced by 12 percent (Table 3-62, in the Wildlife section). None of the proposed timber harvest alternatives would reduce otter habitat capability. The population needed to support current harvest levels is 205 (Table 3-117) and the current habitat capability for the total area of the WAA's is 305. The current habitat capability would provide adequate habitat to support current harvest levels.

Changes in local furbearer distribution are expected when old-growth forest habitat is harvested and those areas convert to second growth.

Waterfowl. A variety of waterfowl use the freshwater and saltwater habitats in the Project Area. The Vancouver Canada goose was selected as an indicator of potential project effects on waterfowl. Vancouver Canada goose habitat capability is assumed to reflect potential Vancouver Canada goose abundance and waterfowl abundance. In the Wildlife section of this chapter, it is projected that habitat capability for Vancouver Canada goose has decreased 26 percent since 1954 (902 to 667, Table 3-62).



Timber harvest unit locations generally avoid important waterfowl areas. The estuary grass flats, beach fringe, and borders of inland lakes and streams would remain largely unaffected. There are no acres of beach fringe or estuary fringe proposed for harvest.

Black Bear. Black bear generally is not utilized as a major food source. About 46 percent of the black bear taken on Prince of Wales Island since 1985/86 have been harvested by nonresident hunters, 20 percent harvested by non-rural residents, and 34 percent harvested by rural residents (see Figure 3-24, in the Wildlife section).

In the Wildlife section of this chapter, it is noted that a 6 percent reduction in potential black bear habitat capability (Table 3-62) has resulted from past timber harvest in the Project Area. Black bear habitat capability is assumed to reflect potential black bear abundance. The overall reduction in black bear habitat capability indicates that the potential reduction in black bear abundance from past activities has not been substantial.

The Wildlife section analysis in this chapter indicates that proposed timber harvest in the action alternatives would potentially reduce black bear habitat capability less than 1 percent. All action alternatives will reduce current habitat capability by an estimated 2 animals. Roads left open to vehicle access for bear hunting following timber harvest may increase hunting success.

Table 3-67, in the Wildlife section of this chapter, shows that proposed timber harvest in important black bear habitats is generally low. No timber harvest is proposed within beach and estuary fringe habitats. Road construction in streamside riparian habitat is less than one percent.

Changes in local black bear distribution will occur in the vicinity of ongoing activities during the life of the proposed project, as black bears tend to avoid contact with people. The bears tend to move back into these areas after timber harvest is completed. Foreseeable changes in local black bear distribution are expected when the age of the second growth on harvest units reaches about 25 years.

With less than a 1 percent decrease in black bear habitat capability, black bear abundance under all alternatives will be sufficient to sustain the 1986 to 1991 average subsistence harvest (Table 3-114, earlier in this section) in Project Area WAA's. Currently the black bear harvest in WAA's 1315, 1420, and 1527 is greater than the estimated habitat capability than the population can sustain (assumed to be 10 percent of the habitat capability), indicating possible overharvest and potential future displacement of hunters. However, due to the fact that 46 percent of bear harvest is by nonresidents and 20 percent by non-rural residents (Figure 3-24 in the Wildlife section), the harvest can be regulated by the Federal Subsistence Board to ensure provision of subsistence needs.

Marine Mammals. Federal law prohibits the taking of marine mammals by anyone other than Native hunters. There is no evidence that timber harvest activities have had any effects on marine mammals taken for subsistence, or that harvest activities have any effect on marine mammal habitat.

Salmon. Salmon are a major subsistence food harvested in the CPOW Project Area. Several concerns about potential effects on the fisheries resource surfaced in public comments during scoping and in response to the Draft EIS. Areas of specific concern were Staney Creek, Logjam Creek, Hatchery Creek, Thorne River, Sarkar Lakes, and Sweetwater Lake.

The Fisheries section of this chapter concludes that potential effects of the proposed timber harvest and road construction alternatives on salmon spawning and rearing habitat would be minimal or eliminated by applying the Forest Service standards, guidelines, and prescriptions described in detail in the Aquatic Habitat Management Handbook (FSH 2609.24) and Soil and Water Conservation Handbook (FSH 2509.22). All salmon spawning and rearing streams (Class I and Class II streams) near proposed timber harvest units are protected by buffers of at least 100 feet as prescribed in the TTRA. In addition, specific prescriptions for protecting salmon habitat were incorporated during the design of harvest and roads.

Based on the implementation of site-specific prescriptions developed during interdisciplinary meetings for protecting salmon spawning and rearing habitat, this EIS projects that the immediate and foreseeable effects on the abundance and distribution of salmon for subsistence uses in the Project Area would not be measurable.

Other Finfish. The action alternatives for the proposed project would have no immediate or foreseeable effect on other finfish habitat. Because there would be no effect on other finfish habitat, the abundance and distribution of those other finfish would not be affected.

Shellfish. Based on the limited impact the existing LTF sites have on marine and estuarine habitat, crabs, and benthic organisms, the effect of this project on the abundance and distribution of local crabs, clams, and other shellfish would not be measurable for purposes of subsistence. The project would not have any additional impacts on shellfish for the foreseeable future.

Other Food Resources. Other foods include plants such as kelp, goose tongue, a variety of berries, etc. Most traditional other food gathering occurs near beach and estuarine areas. Timber harvest units and roads proposed in action alternatives F2 through F6 in the Project Area may infringe upon beach areas potentially used for other food gathering if gathering extends beyond 500 feet of the beach (there are no proposed harvest units within 500 feet of the beach). Road construction activities would improve access to berry picking sites that are now not reasonably accessible.

Since beach fringe and estuaries would not be significantly affected by the proposed timber harvest, and since additional food gathering sites would be made available, the project's activities and foreseeable impacts are not expected to substantially affect the abundance and distribution of other foods.

Firewood/Personal Use Wood. The Forest Service has a free-use policy (with limits) for firewood and timber and none of the proposed alternatives would have an adverse effect on the availability of firewood, personal-use timber, and traditional uses of wood, such as for totem poles.

Other Resources: Access

New and rebuilt roads would provide access to areas that were not previously used for subsistence harvesting resources. (See Alternative maps, separate map packet, for details.) Miles of road proposed for construction are shown in Figure 2-5 in Chapter 2). Road access would favor harvest by residents who live in communities connected to the road system or who bring a vehicle to POW Island on the ferry.

Road closures and other management prescriptions developed for Project Area roads would take subsistence uses into consideration. For the purposes of this EIS, the Access Management Plan would be the same as that specified in Option B in the 1989-94 LTS EIS.

Other Resources: Competition

Competition for subsistence resources in the CPOW Project Area is an issue to residents of Prince of Wales Island, who are concerned with competition from residents of Ketchikan, mostly because of the numbers of people that come to the island via the ferry. Since Ketchikan residents are considered non-rural, this competition can be regulated if it starts to restrict non-rural residents' ability to obtain subsistence resources. Another source of competition is from rural, subsistence users who become displaced from traditionally used areas.

There is no evidence to indicate that the proposed project activities would affect the availability of salmon, finfish, shellfish, or other food resources for rural or non-rural

harvest. Any increase in competition from non-rural residents and nonresidents can be regulated by the Federal Subsistence Board.

Individual household use of specific areas may be displaced by some of the proposed actions. There is not sufficient information available nor would it be practical to evaluate displacement potential for individual households. The Project Area's accessibility makes it very unlikely that an individual household or even an entire community would need to exclusively rely on specific areas within the Project Area that may be affected by proposed actions. Generally, there are sufficient lands available elsewhere within or outside the Project Area for subsistence gathering. The known uses of the Project Area by individual communities is discussed earlier in this section.

Other Resources: Cumulative Effects

This EIS evaluates the cumulative effects on subsistence practices in the Project Area and other Forest Service lands associated with continued implementation of the TLMP. The evaluation of cumulative effects for subsistence resources determines whether or not future activities may restrict subsistence uses and identifies the rural communities using the Project Area that would be most affected by a restriction.

The Wildlife section projects that timber harvest would affect the habitat capability of several wildlife species. The changes in habitat capability could affect their abundance and distribution. Relative to habitat capability estimated for 1954, the potential deer habitat capability by the year 2040 is projected to decrease cumulatively by 43 percent; the potential marten habitat capability is projected to decrease cumulatively by 32 percent; the potential black bear habitat capability is projected to decrease cumulatively by 13 percent; the potential otter habitat capability is projected to decrease cumulatively by 12 percent; the potential Vancouver Canada goose habitat capability is projected to decrease cumulatively by 40 percent (Table 3-77, in the Wildlife section of this chapter).

These potential decreases in abundance could increase competition for the species important for subsistence. However, the abundance of black bear, marten, otter, and waterfowl appears to be sufficient to meet subsistence needs in the Project Area. Fish, shellfish, and other food resources should likewise be available to meet subsistence needs.

Actions on other lands surrounding the Project Area could also affect the abundance or distribution, access to, and competition for the subsistence resources harvested by the rural communities using the Project Area. Appendix A displays the other Forest Service timber sale projects in progress or being planned in the vicinity of the CPOW Project. Enough is known about foreseeable activities on other lands surrounding the Project Area to project that subsistence use of deer may be significantly restricted in the future. Subsistence use of salmon, other finfish, shellfish or other resources in the Project Area is not expected to be significantly restricted.

Other Resources: Findings

The above analysis leads to the conclusion that the actions proposed in Alternatives F2 through F6 do not present a significant possibility of a significant restriction on subsistence use of black bear, furbearers, waterfowl, marine mammals, salmon, other finfish, shellfish, or other food resources in the Project Area (Tables 3-125 and

3-126). This finding is based on the potential resource effects by the three evaluation categories: abundance and distribution, access, and competition.

Table 3-125
Significant Possibility of a Significant Restriction of Subsistence Use of Fish Resources

	Alternatives						
	1	1a	F2	F3	F4	F5	F6
Abundance or Distribution	No	No	No	No	No	No	No
Access	No	No	No	No	No	No	No
Competition	No	No	No	No	No	No	No

SOURCE: Matson 1993.
Note: "No" indicates an insignificant possibility of a substantial effect. "Yes" indicates a significant possibility of a substantial effect.

Table 3-126
Significant Possibility of a Significant Restriction of Subsistence Use of Other Resources

	Alternatives						
	1	1a	F2	F3	F4	F5	F6
Abundance or Distribution	No	No	No	No	No	No	No
Access	No	No	No	No	No	No	No
Competition	No	No	No	No	No	No	No

SOURCE: Matson 1993.
Note: "No" indicates an insignificant possibility of a substantial effect. "Yes" indicates a significant possibility of a substantial effect.

Other Conclusions

Section 810 (a) (3) of ANILCA requires that when a significant restriction may occur, determinations must be made in regard to whether:

> Such a significant restriction of subsistence uses is necessary and consistent with sound management principles for the utilization of public lands;
>
> The proposed activity will involve the minimum amount of public lands necessary to accomplish the purposes of such use and occupancy, or other disposition;
>
> Reasonable steps will be taken to minimize adverse impacts upon subsistence uses and resources resulting from such actions.

The following section outlines the other conclusions of this EIS.

Necessary and Consistent with Sound Management of Public Lands

The alternatives proposed in the Central Prince of Wales EIS have been examined to determine whether they are necessary and consistent with sound management of public lands. In this regard the National Forest Management Act of 1976, the ANILCA, the Alaska Regional Guide, the TLMP, the TLMP 1985-86 Amendment, 1991 TLMP Revision Draft EIS, the Alaska State Forest Practices Act, and the Alaska Coastal Zone Management Program have been considered.

The ANILCA placed an emphasis on the maintenance of subsistence resources and lifestyles. The TTRA removed the 4.5 MMBF requirement from ANILCA but directed the Forest Service "to the extent consistent with providing for the multiple use and sustained yield of all renewable forest resources, [to] seek to provide a supply of timber from the Tongass National Forest which (1) meets the annual market demand for timber from such forest and (2) meets the market demand from such forest for each planning cycle", and left the volume requirements and contract area of the KPC contract in place.

The action alternatives presented here encompass five different approaches that would produce the resources that would best meet the purpose and need of this EIS. All of the alternatives involve some potential to affect subsistence uses. There is no alternative, including the no-action alternative, that would avoid a significant possibility of subsistence restrictions somewhere in the Forest. Therefore, based on the analysis of the information presented in this document on the proposed alternatives, these actions are necessary and consistent with the sound management of public lands.

Amount of Public Land Necessary to Accomplish the Purpose of the Proposed Action

Appendix A addresses the availability of other lands within the KPC contract area suitable for the timber harvest. Much of the Tongass National Forest is used by one or more rural communities for subsistence purposes for deer hunting. The areas of most subsistence use are the areas adjacent to existing road systems, the beaches, and the areas in close proximity to communities. Within the Project Area, the extent and location of the subsistence use area precludes complete avoidance. Areas other than subsistence use areas that could be harvested may be limited by other resource concerns such as: soil and water protection; high value wildlife habitat; economics; visuals; or unit and road design. Effort was taken to protect the highest value subsistence areas. For example, beach fringe is one of the highest use subsistence areas and none will be harvested under any of the proposed alternatives.

The impact of viable timber harvest projects always includes alteration of old-growth habitat, which in turn always reduces projected habitat capability for old-growth-associated subsistence species. It is not possible to lessen harvest in one area and concentrate it in another without affecting one or more rural communities' important subsistence use areas.

Reasonable Steps to Minimize Adverse Impacts Upon Subsistence Uses and Resources

Reasonable steps to minimize impacts on subsistence have been incorporated in development of the alternatives and project design criteria. Project design criteria called for locating roads and units outside of important subsistence use areas such as the beach fringe, estuary fringe, and riparian areas adjacent to salmon streams.

During development of alternatives, an effort was made to minimize activities that could adversely affect important subsistence use areas.

EIS Conclusions

The Record of Decision (ROD) for the CPOW EIS will include a final determination about the significant restriction on subsistence use that may result from implementation of the selected alternative. Below is a summary of the EIS evaluation and findings.

1) The potential foreseeable effects from the action alternatives in the CPOW project do not present a significant possibility of a significant restriction of subsistence uses of black bear, furbearers, marine mammals, waterfowl, salmon, other finfish, shellfish, and other foods.

2) There is a significant possibility of a significant restriction of subsistence use of deer in the Project Area for Coffman Cove, Craig, Hollis, Hydaburg, Kasaan, Klawock, Thorne Bay, and Whale Pass residents regardless of which alternative is implemented, including the no-action alternatives.

3) At some point in the future it may be necessary to restrict the non-rural harvest of deer and give rural residents priority.

Hearings

On the basis of findings of this analysis and under the provisions of the Alaska National Interest Lands Conservation Act, subsistence hearings were held on the dates, times, and at the places announced in the letter accompanying the Draft EIS. These included: Nov. 17, Klawock; Nov. 18, Craig; Nov. 19, Hydaburg; Nov. 23, Ketchikan; Nov. 24, Saxman; Dec. 1, Thorne Bay; Dec. 2, Whale Pass; Dec. 3, Coffman Cove.

Letters announcing hearing dates, times, and locations were sent to the Federal Subsistence Board, Alaska Department of Fish and Game, Regional Fish and Game Advisory Councils, Local Fish and Game Advisory Committees, and to the Post Offices in Coffman Cove, Craig, Hydaburg, Klawock, Ketchikan, and Thorne Bay, where hearings were held. Announcements were made in newspapers (including formal Legal Notices in the *Ketchikan Daily News*, Oct. 23-26, and the *Island News*) and on the radio.

Testimony at the hearings was both verbal and written; verbal comments were recorded and transcribed by USDA Forest Service personnel. Testimony received, both verbal and written, was analyzed and incorporated into the EIS, as determined to be necessary by the Forest Service. For further details on responses to the comments received during subsistence hearings, see Appendix D.

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SOCIO-ECONOMIC ENVIRONMENT

Key Terms

Cant - a log partially or wholly cut and destined for further processing
Discounted Benefits - the sum of all benefits derived from the Forest over the life of a project
Discounted Costs - the sum of all costs incurred from the Project Area during its period of implementation
Present Net Value - the difference between benefits and costs associated with the alternatives

Introduction

The affected environment and environmental consequences portions of the economic and social environment will be discussed together for each sub-section. The sub-sections are: Communities and Lifestyles, Employment and Income, Net Cash Flow and Payments to State, Economic Efficiency, and Timber Demand Analysis.

The economies of most communities affected by the Central Prince of Wales (CPOW) project depend on the Tongass National Forest to provide natural resources for uses such as fishing, hunting, tourism, recreation, timber harvesting, and subsistence uses. Maintaining a sustainable flow of these natural resources is of concern to individuals within these communities.

Historical Social and Economic Trends

The society affected by the CPOW project is influenced by a variety of cultures, from its earliest peoples to its most recent inhabitants. The abundant resources of the forest and waters have provided food, shelter, and livelihood to its inhabitants for thousands of years. The first inhabitants of the area, the Tlingit and Haida, adapted well to the coastal environment, and were able to subsist on the area's natural resources, developing rich cultures. The numerous waterways allowed for mobility, which aided in expanding trade and gathering food.

In the 1700's, the Russians began exploration in Alaska. The fur trade, primarily sea otter pelts, was the main force driving European colonization. When most of the sea otter populations were depleted, the fur industry declined, and Russia lost interest in her North American colony. Alaska was then sold to the U.S. in 1867.

As colonization continued with U.S. occupation, new industries developed. In the late 1800's commercial fish canning became an important part of the economy of area influenced by the CPOW project. During that same period, the discovery of gold brought thousands of miners to the area, many of whom were then followed by their families. In the 1920's and 1930's, the Depression brought a decline in fish prices and mining employment.

Timber resources were used by the earliest inhabitants for shelter, heat, utility, and cultural purposes. The Russians also harvested timber for building ships and structures, but commercial timber harvest did not develop until the 1900's. In the earlier part of the century, small timber mills were operated in a few communities, but it was not until the mid twentieth century, that the timber industry became a major social and economic factor in the area affected by the CPOW project, with the development of a large-scale pulp mill in Ketchikan.

Statehood resulted in an economic shift toward more government employment, and an expanding timber industry had implications beyond changes in population levels and distribution. It was a shift towards a diversified economy, with less dependence on extractive and nonrenewable resources, and away from a seasonal·economy.

Today, most of the population in the area affected by the CPOW project is concentrated in the urban community of Ketchikan (13,828). The same industries which dominated the area's history—fishing and timber production—are still prominent industries in Ketchikan. In addition, tourism, which has increased in its economic importance over the past several years, provides a major source of income to the economies of all communities. Government, transportation, and education are also significant sources of income. There are numerous small, rural communities as well, which depend primarily on fishing, timber production, and subsistence for their livelihoods.

Communities and Lifestyles: Affected Environment

The following communities were determined to be those primarily affected by the CPOW project: Coffman Cove, Craig, Hollis, Hydaburg, Kasaan, Klawock, Ketchikan, Port Protection, Point Baker, Saxman, Thorne Bay, and Whale Pass. Each of these communities will first be briefly described in terms of its history, population, economic base, and other lifestyle influences. The estimated consequences of each of the CPOW alternatives will then be described for each community.

Coffman Cove

Coffman Cove was originally established about 1965 as a logging camp by Ketchikan Pulp Company. The State of Alaska selected lands around Coffman Cove in 1981 and has begun disposing of the acreage. The 1990 Census data has 186 people residing in the community. Coffman Cove is directly dependent on the timber industry, although a small amount of commercial fishing, charter boat operations, and aquaculture occurs.

Craig

Craig is the the largest POW community, with a population of 1,260. The community originally was a Native settlement. However, beginning with a cannery constructed in 1907, the population began to change, and today it is only about 25 percent Native. The current economy is based on commercial fishing, logging, and community services.

Hollis

Hollis was first established in the early 1900's with the discovery of gold. There were four mines in the immediate area and several others nearby. Hollis was the location of the first timber harvest under the Ketchikan Pulp Company Long-Term Sale Contract and was the main source of timber for the pulp mill from 1954 to 1962.

The present community was established in 1981 after a State land sale. The current population is 111 people. Many of the residents have full-time jobs in adjacent communities such as Craig and Klawock. Since the community was established, there has been a steady flow of construction work associated with with roadbuilding and ferry terminal reconstruction. The ferry terminal at Clark Bay is the only ferry terminal on Prince of Wales Island for the Alaska Marine Highway system.

Hydaburg

Hydaburg is a Native village established by the Haidas in 1911 and incorporated as a city in 1915. The 1990 Census has 384 people residing in the community. The Hydaburg economy is based on timber and fishing. Subsistence use also plays a major role in the community.

Kasaan

Kasaan is a village of 54 people located on the western side of Kasaan Penninsula. The community was established on the current location in 1898. Kasaan's economy is based on fishing and timber harvest. Because the economy of the community is currently depressed, subsistence plays a major role in the maintenance of existing lifestyles.

Ketchikan

Ketchikan is located in southern Southeast Alaska, on the southwest side of Revillagigedo Island on Tongass Narrows opposite Gravina Island. Ketchikan is approximately 40 miles, by water, from the Project Area. Ketchikan's 1990 borough population was reported as 13,828.

The Ketchikan area was a summer fishing camp for the Tlingit Indians. Development began with a saltery at the mouth of Ketchikan Creek. Ketchikan was a boom town in the late 1800's. Since the early 1900's, timber products have been an important economic influence in Ketchikan. In 1954, a world-scale pulp mill was built in Ward Cove. Due to its location as transportation center, fishing center, and focus for the region's timber industry, Ketchikan grew rapidly in the 1950's. Recently, tourism has grown in economic importance, along with government, and services.

Klawock

Klawock is a Native community incorporated in 1929. It has a population of about 722, with an economy based on timber harvesting and fishing. The community became a first-class city in 1973.

Metlakatla

Metlakatla is on the south point of Annette Island. The 1990 census reported there were 1,407 people living in the community of which 1,175 or 84 percent were Native.

This unique community was established in 1887 when a band of Tsimshian Natives migrated from Northern British Columbia. In 1891 Congress designated Annette Island an Indian reservation, the first in Alaska. The economy of Metlakatla is based on sawmill operations of the Louisiana Pacific Annette Hemlock Mill, commercial fishing, Annette Island Packing Company (a community owned cannery), the Tamgass Creek Hatchery, and Metlakatla Indian Community Services.

Port Protection/Point Baker

Port Protection and Point Baker are located on the northern tip of Prince of Wales Island. About 2.2 miles of water separates the two communities, but they are tied together by a common store, Fish and Game Advisory Committee, and similar economies and lifestyles. The community of Point Baker was founded approximately 50 years ago, and Port Protection was founded at least 30 years ago. In the 1930's, the Forest Service opened some areas, then part of the Tongass National Forest, for homesites. In 1950, residents petitioned for homesites along the shore of Port Protection. In 1955, the townsite of Point Baker was removed from the Tongass National Forest and in 1977, the State of Alaska selected the Port Protection area.

The 1990 Census data shows the population of Point Baker as 39 people and the population of Port Protection as 62 people.

The Port Protection/Point Baker economy is seasonal in nature, peaking in the summer/fall fishing season. As with other small communities, employment opportunities outside the fishing industry are limited and the residents of the two communities depend on renewable resources.

Saxman

Saxman is located on west Revillagigedo Island on the Tongass Highway, south of Ketchikan. Its population is 266, with 80 percent being Alaska Natives.

Tlingit Indians from the villages of Cape Fox and Tongass chose Saxman as a permanent settlement for a school in 1894, and the community consequently developed there. Fishing and milling timber for themselves and the growing community of Ketchikan were its economic mainstays.

In 1939-40, artifacts and totem poles were retrieved from the original Cape Fox and Tongass village sites and placed in a totem park in Saxman. This park is now a major cultural center and tourist attraction.

Being near Ketchikan, Saxman did not develop an independent economy until recently. Although Saxman residents still depend on Ketchikan for most services and employment opportunities, development of a barge terminal, and the Cape Fox Village Corporation investments, have led to some recent growth in Saxman's population and economic base.

The economic sectors of Saxman include local government, followed by social and health services, retail trade, and fisheries. Additionally, the Saxman Seaport, a major transportation storage facility, is a base for industrial operations for several Ketchikan area businesses. These include: Petrolane, R-K Construction, Cochran Electric, Revilla Recycle Inc., Princess Tours, and Saxman Wood Products. Revilla Recycle collects and ships recyclable goods from the greater Ketchikan area. Saxman Wood

Products, a new sawmill specializing in the processing of small diameter logs, has recently opened and is expected to provide employment for up to 30 individuals.

Thorne Bay

Thorne Bay, on the east side of Prince of Wales Island, is a community of about 569 people. It was a logging camp until August 1982, at which time it was incorporated as a second-class municipality. Hunting, fishing and other subsistence activities have always been used to supplement food sources.

Currently, the economy is based on logging, commercial fishing, charter boat operations, and a few community services. Fishing activities center around Thorne River, which has large runs of salmon and trout. Crabbing, clamming, and shrimping are popular activities in the waters adjacent to the community.

Whale Pass

Whale Pass is a communitiy of approximately 75, which was originally established by Ketchikan Pulp Company as a logging camp about 1962. Lands in the Whale Pass area were originally selected by the State of Alaska in 1977. Currently, the economy is based on commercial fishing, charter boat operations, logging/road construction, aquaculture, and traditional subsistence activities. A lodge is located in Whale Pass but reportedly does not utilize local workers or services.

Communities and Lifestyles: Effects of the Alternatives

Table 3-127 displays the short-term social consequences expected to be felt in each of the communities described above. It depicts whether the alternative will have a high, moderate, or low support of the community's lifestyle. It also shows whether the alternative will have a high, moderate, or low coincidence with the community's attitudes, beliefs, and values. Finally, the table indicates if there would be an extreme, slight, or no disruption of community stability and cohesion. Factors considered in this analysis included: dependence on logging, sawmill employment, road access, subsistence use of the area, and recreation use of the area. Public perceptions in the communities regarding resource management were also factored into the analysis.

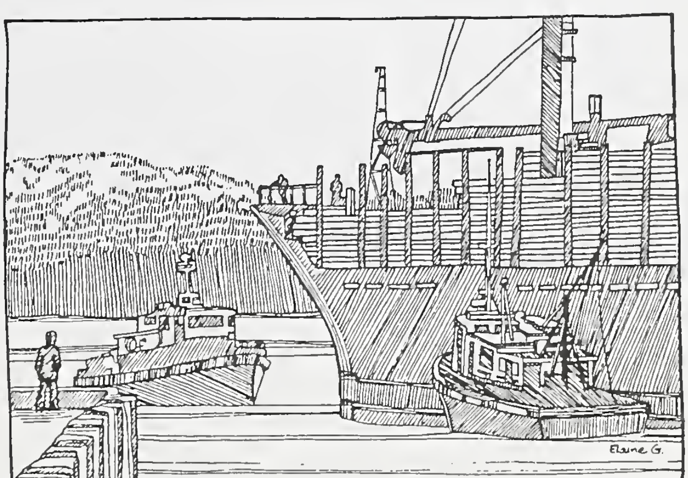


Table 3-127
Community Lifestyle Changes (Short-term)

	Alternative	Support of Lifestyles	Support of Attitudes/Beliefs/Values	Disruption of Community Stability
Coffman Cove	1 and 1a	Low	Low	Extreme
	F2	High	High	No
	F3	High	High	No
	F4	High	High	No
	F5	High	High	No
	F6	High	High	No
Craig	1 and 1a	High	High	Slight
	F2	Moderate	Moderate	No
	F3	Moderate	Moderate	No
	F4	Moderate	Moderate	No
	F5	Moderate	Moderate	No
	F6	Moderate	Moderate	No
Hollis	1 and 1a	High	High	No
	F2	Low	Low	No
	F3	Low	Low	No
	F4	Low	Low	No
	F5	Low	Low	No
	F6	Low	Low	No
Hydaburg	1 and 1a	High	High	Slight
	F2	Moderate	Moderate	No
	F3	Moderate	Moderate	No
	F4	Moderate	Moderate	No
	F5	Moderate	Moderate	No
	F6	Moderate	Moderate	No
Kasaan	1 and 1a	Moderate	Moderate	Slight
	F2	Low	Low	No
	F3	Low	Low	No
	F4	Low	Low	No
	F5	Low	Low	No
	F6	Low	Low	No
Ketchikan	1 and 1a	Low	Low	Extreme
	F2	High	High	No
	F3	High	High	No
	F4	High	High	No
	F5	High	High	No
	F6	High	High	No
Klawock	1 and 1a	High	High	Slight
	F2	Moderate	Moderate	Slight
	F3	Moderate	Moderate	Slight
	F4	Moderate	Moderate	Slight
	F5	Moderate	Moderate	Slight
	F6	Moderate	Moderate	Slight

continued

Table 3-127 continued

	Alternative	Support of Lifestyles	Support of Attitudes/Beliefs/Values	Disruption of Community Stability
Port Protection	1 and 1a	High	High	Slight
	F2	Low	Low	Slight
	F3	Low	Low	Slight
	F4	Low	Low	Slight
	F5	Low	Low	Slight
	F6	Low	Low	Slight
Point Baker	1 and 1a	High	High	Slight
	F2	Low	Low	Slight
	F3	Low	Low	Slight
	F4	Low	Low	Slight
	F5	Low	Low	Slight
	F6	Low	Low	Slight
Saxman	1 and 1a	High	High	Slight
	F2	Moderate	Moderate	No
	F3	Moderate	Moderate	No
	F4	Moderate	Moderate	No
	F5	Moderate	Moderate	No
	F6	Moderate	Moderate	No
Thorne Bay	1 and 1a	Low	Low	Extreme
	F2	High	High	No
	F3	High	High	No
	F4	High	High	No
	F5	High	High	No
	F6	High	High	No
Whale Pass	1 and 1a	High	High	Slight
	F2	Low	Low	Slight
	F3	Low	Low	Slight
	F4	Low	Low	Slight
	F5	Low	Low	Slight
	F6	Low	Low	Slight

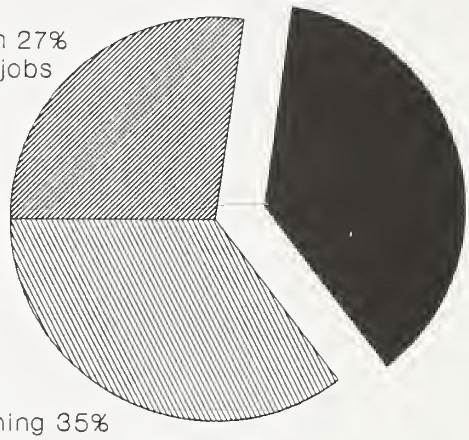
Thorne Bay, Prince of Wales Island, is one of the communities evaluated for effects of CPOW alternatives.

Employment and Income: Affected Environment

Southeast Alaska's economy is characterized by its dependence on three major industries: forest products, commercial fishing, and tourism. Participation in subsistence activities is also important, but it is difficult to quantify its relative value. While the forest products and fishing industries have provided a relatively constant employment base over the past decade, the tourism industry has increased by approximately 30 percent over this period.

Figure 3-65 shows average decadal employment by these three industries.

Figure 3-65
Average Decadal Employment, by Industry



Timber Industry

The forest product mix from the area affected by the CPOW project includes dissolving pulp, logs, cants, dimension lumber, and woodchips. The industry's structure has changed significantly over the past ten years. In 1980, the industry was focused on processing timber from the Tongass National Forest into cants and dissolving pulp; the sawmills processed primarily large-diameter spruce logs, which were sawn just enough to meet the minimum federal standards for export. The smaller or defective spruce logs and most of the hemlock logs were chipped for pulping.

Today, the forest products industry affected by the CPOW project processes a wide spectrum of spruce and hemlock diameter logs into finished lumber products. The wood wastes from the sawing process are chipped for sale. In addition, a new market in Asia developed in the early 1980's for logs from lands conveyed to Alaska Native Corporations through the Alaska Native Claims Settlement Act (P.L. 92-203). Between 1981 and 1985, total employment in the lumber and pulp mills dropped 29 percent and a number of the smaller, less efficient sawmills were abandoned. However, after this structural change, the industry rebounded as market conditions improved. Timber related employment in 1991 is virtually identical with the 1980 level.

A constant supply of Tongass timber is not the only factor controlling timber employment. Other controlling factors include exchange rates, the overall Pacific Rim demand for wood fiber, and competition among timber suppliers outside the Tongass National Forest. The historical timber industry employment in Southeast Alaska is shown in Table 3-128.

Table 3-128
Timber Industry Employment In Southeast Alaska

Year	Total Southeast Direct Employ. (Jobs)	Total Southeast Timber Employ (Jobs)	Contribution to total Employ. by KPC Harvest of Nat'l. For. Timber (Jobs)	(%)
1980	2,949	5,249	1,785	34
1981	2,733	4,858	1,065	22
1982	2,506	4,456	1,032	23
1983	2,293	4,093	1,020	25
1984	2,041	3,641	1,271	35
1985	1,947	3,447	1,219	35
1986	2,342	4,167	1,107	27
1987	2,790	4,740	1,376	29
1988	3,341	5,691	1,536	27
1989	3,516	6,066	1,775	29
1990	3,543	6,113	1,697	28
1991	3,069	5,295	1,376	26

Source: Alaska Department of Labor, USDA Forest Service IPASS Analysis.

Commercial Fishing

Although the commercial fisheries industry in Southeast Alaska continues to fluctuate, it remains a major component of the economy. Salmon stocks have recovered from their low levels in the early 1970's. Salmon continues to dominate the industry, both in volume and value of catch, and in harvest-related employment. The labor force and employment associated with fishing is highly seasonal. Table 3-129 shows that fish harvest employment remained relatively stable between 1980 and 1988, largely because Alaska's commercial fisheries have become increasingly regulated. A permit system for salmon regulates the number of harvesters with access to the fishery; halibut harvest is regulated through limited openings and permits. Seafood processing, also a vital component of Southeast Alaska's economy, has undergone changes since 1980. Of major significance were an increased use of floating fish processing facilities, and a trend toward frozen rather than canned salmon.

Table 3-129
Fish Harvesting and Employment In Southeast Alaska

Year	Salmon Harvest (1,000 pounds)	Direct Employment (Jobs)	Total Employment (Jobs)
1980	93,027	3,475	4,700
1981	110,718	3,142	4,267
1982	122,991	3,332	4,507
1983	155,676	3,078	4,178
1984	154,846	3,277	4,452
1985	231,024	3,450	·4,675
1986	214,997	3,500	4,750
1987	73,532	3,600	4,875
1988	90,696	3,500	4,725

Source: Alaska Commercial Fisheries Entry Commission, Alaska Department of Labor, Research and Analysis Section, USDA Forest Service IPASS analysis March 1990.

Subsistence

Subsistence hunting, fishing, trapping, and gathering activities represent a major focus of life for many local residents affected by the CPOW project. Some individuals participate in subsistence activities to supplement personal income and provide needed food. Historically the communities affected by the CPOW project have been economically tied to resource-related industries such as commercial fishing, timber harvesting, and recently, tourism. Employment in these industries is seasonal. Salmon return to spawn in the late spring, summer, and early fall. Snow and darkness prohibit much work in timber harvesting during winter months. The tourism season coincides with the summer months.

Within this context of seasonal employment, subsistence harvest of fish and wildlife resources takes on special importance. The use of these resources may play a major role in supplementing cash incomes during periods when the opportunity to participate in the wage economy is either marginal or non-existent. Due to high prices of commercial products provided through the retail sector of the cash economy, the economic role of locally available fish and game takes on added importance. Although subsistence resources are known to be very important to local communities, the exact value of these resources is not possible to quantify in monetary terms at this point. For a discussion of the effects on the demand and availability of these resources, see the Subsistence section of this chapter.

Recreation And Tourism Industry

During the 1980's, tourism became a major industry in Southeast Alaska. Cruiseships traveled the Inside Passage making regular stops at Southeast ports in record numbers. Between 1980 and 1986, cruiseship passenger numbers increased by nearly 90 percent. Total visitors to Southeast Alaska grew from 205,000 in 1983 to 350,000 in 1986. Because the tourist season also expanded to include much of May and September, its economic significance is likely to increase.

Table 3-130
Recreation and Tourism Indicators

Year	Southeast Cruiseship Passenger Numbers *1	Southeast Ferry System Use *2	Scenic Flight Passengers Misty Fiord *3
1981	85,000	282,000	6,300
1982	85,000	300,000	5,200
1983	96,782	308,000	5,300
1984	96,705	311,000	7,000
1985	145,646	313,000	12,000
1986	182,400	296,070	11,900
1987	202,000	326,644	12,200
1988	209,519	344,209	8,500
1989	197,790	344,389	8,100
1990	236,325	363,122	NA
1991	242,755	368,780	NA
1992	263,046	372,680	NA

*1 From Ketchikan Visitors Bureau, Ketchikan, Alaska, for arrivals to Ketchikan.
*2 From Doug Burton, Alaska Marine Highway Program - Traffic Division (465-3946), Annual Traffic Reports - "Traffic Volumes by Port" Represents Boarding Passenger numbers.
*3 From Misty Fiords National Monument (225-2148).

Marketing studies by the Alaska Division of Tourism indicate that "scenery, forest, mountains, out-of-doors" and "wilderness, unspoiled, rugged" were the top interests appealing to potential visitors (Bright 1985). Resident recreation also increased during the 1980's as indicated by fishing and hunting license sales.

Unlike other industries, the tourism and recreation "industry" is not a single industry, but a composite of many that serve more than tourists. For example, retail trade, service, and transportation serve tourists as well as local industries and residents. The labor force and employment associated with tourism and recreation are different than manufacturing. The jobs tend to be highly seasonal and low paying.

Table 3-131
Recreation and Tourism Employment In Southeast Alaska, in Number of Jobs

Year	Direct Employment	Total Employment
1980	2,100	3,000
1981	2,200	3,125
1982	2,300	3,250
1983	2,400	3,400
1984	2,500	3,550
1985	2,600	3,675
1986	2,700	3,825
1987	2,800	3,925
1988	2,750	3,900

Source: USDA Forest Service IPASS Analysis, March 1990.

Employment and Income: Effects of the Alternatives

Assumptions and Models

The mix and level of goods and services provided in each alternative have the potential to affect the number of jobs throughout Southeast Alaska. In estimating job impacts it is assumed that other supply and demand factors affecting markets for forest products and uses remain constant. This assumption becomes more tenuous the further out in time projections of effects are made. For example, the amount of timber offered for sale by the Project Area is not, and will never be, the only factor that affects the number of timber industry jobs. Worker productivity, interest rates, import and export levels, production and shipping costs, regional competition, private and public land harvest levels and policies, and other factors all affect the supply of and demand for timber and the subsequent number of jobs.

National Forest Timber Employment

The employment estimates displayed in this section include the total effect throughout the economy associated with timber harvesting and processing. This total includes three separate components: direct effects, indirect effects, and induced effects. These components are defined as follows:

- **Direct Effects for Employment and Income** — Those that affect sectors either exporting processed wood products from the economic area or selling those products to final consumers. An example of direct employment would be people working in a sawmill.

- **Indirect Effects for Employment and Income** — Those that affect other production, trade, and service sectors that provide the production inputs needed to manufacture the processed wood products. An example of indirect employment would be people who manufacture the saw blades used in the sawmills.

- **Induced Effects for Employment and Income** — Those that affect consumer spending within the economic area associated with jobs that support the direct

"The total timber-related employment estimate is derived by multiplying 8.67 by the total timber volume harvested for each alternative."

and indirect production. An example of induced employment would be grocery store employees who sell products to the people working in sawmill or making saw blades.

Total timber-related employment is based on 8.67 total jobs per million board feet as developed by the computer simulation model IPASS (Developed for the Forest Service to analyze the effects of agency managemant initiatives and investments on employment and earnings in Southeast Alaska.). The total timber-related employment estimate is derived by multiplying 8.67 by the total timber volume harvested for each alternative (Table 3-132), and includes direct, indirect and induced jobs as identified above.

Table 3-132
CPOW Contributions to Projected Timber Related Employment

	Number of Timber-Related Jobs by Alternative						
Year	1	1a	F2	F3	F4	F5	F6
1993	0	0	209	206	204	208	205
1994	0	0	605	595	588	602	593
1995	0	0	627	618	611	625	616
1996	0	0	883	870	860	880	866
Volume (MMBF)	0	0	268	264	261	267	263

SOURCE: Shoaf 1993

Alternatives 1 and 1a propose no timber harvest and could result in a decline in timber related employment should the mill not be able to substitute volume from another source. The effects could range from elimination of shifts to a partial or a full short-term shutdown. Alternatives F2 through F6 would contribute to meeting Forest Service/KPC Contract volume commitments and the retention of current employment levels.

The no-action alternatives could have short-term impacts as mentioned above, with possible long-term ramifications to the contract holder, the core communities, and ultimately Southeast Alaska, through possible destabilization of the wood products industry. Long-term impacts of the action alternatives on timber employment on the Ketchikan Administrative Area are a function of the Forest Plan, and the analysis is incorporated by reference from the TLMP Draft Revision (1991a); however, the primary effect of any of the action alternatives would be maintenance of current employment levels.

Timber Value

For a detailed discussion on logging costs, pond log values, transportation and construction costs, refer to the Timber section of this chapter.

Table 3-133 displays a summary of the estimated value and costs of each alternative. Net values are rounded, since the figures are based on estimates.

Table 3-133
Summary of Estimated Stumpage Values by Alternative, in Thousands of Dollars

Alt.	Estimated Total Volume (MMBF)*	Estimated Pond Value (M$)**	Profit/Risk at 60% of Normal (M$)	Estimated Costs (M$)***	Total Est. Stumpage Value (M$)
1	0	0	0	0	0
1a	0	0	0	0	0
F2	268	90,268	12,928	76,459	881
F3	264	89,369	12,746	75,987	636
F4	261	87,798	12,596	74,906	296
F5	267	90,171	12,859	76,290	1,022
F6	263	89,239	12,666	76,420	153

* Rounded to the nearest million board feet
** Values are meant for comparative purposes only, and are based on mid-market values.
*** Includes all logging and road costs, such as; fall, buck, yard, sort, load, haul, dump, raft, and tow, as well as pit development, clearing, grubbing, embankment, haul, excavation, and related materials such as culverts and bridges for LTF development, road construction and reconstruction.
SOURCE: W. Shoaf 1993

Community Stability

One of the initial goals of the Long-Term Contracts was "to provide a sound economic base in Alaska through establishment of a permanent year-round pulp industry. The belief was that, to attract the timber industry to Alaska, a long-term assured supply of timber was necessary" (TLMP Draft Revision). The harvest and processing of timber in Southeast Alaska supports the general economic infrastructure of Southeast as a whole, but supports the economy of some communities more than others. While timber harvest and processing influences community stability through the economic health of all Southeast Alaska generally, and certain communities specifically, the original intent was to provide general support of the Southeast Alaska economy as a whole.

Maintenance of Long-Term Contract commitments through a sustained even-flow harvest schedule supports specific communities where that volume is harvested or processed. This process then goes full circle, as the health of those communities affects the general health and infrastructure of the Southeast Alaska economy as a whole. Additionally, the Forest Service strives to support local economies whenever possible, even though historical levels of support or harvest may not be feasible on a localized basis.

The even-flow sustained-yield mandate of NFMA on the Tongass National Forest is practiced on a similarly broad area. While NFMA's intent for sustained yield was on a Forest-by-Forest basis, some discretion was permitted. Because of the large size of the Tongass National Forest, even-flow sustained yield calculations are made on an Area-by-Area basis for the Chatham, Stikine, and Ketchikan administrative areas; this meets the NFMA sustained-yield mandate on the Tongass, as addressed in the TLMP Draft Revision (Appendix B and the Timber section of Chapter 3), with CPOW representing one component of that even-flow strategy. Determination of the physical area on which sustained yield is practiced is a function not of this EIS, but of

the Forest Plan. However, CPOW is crucial to providing an even-flow sustained yield within the Ketchikan Administrative Area and to meeting the even-flow needs of an industry which supports the overall economic infrastructure of Southeast Alaska.

Figures 3-66 through 3-70 show the previous and currently planned harvest levels for the overall Project Area, as well as for the four major communities which will harvest the timber. Also shown is the anticipated future harvest levels from the TLMP Draft Revision, which assumes all suitable available CFL can be harvested and concludes that harvest levels will continue at or near current levels. While it is an over simplification to show even-flow harvest over a 50-year period, it is relevant to display the average level that can be maintained. Specific locations and amounts of timber to be harvested are displayed in Appendix A. Decadal harvest will be influenced by fluctuations in the timber markets, ASQ's determined by future forest plans, congressional appropriations, etc.

Figure 3-66
Average Decadal Harvest for Total CPOW Project Area

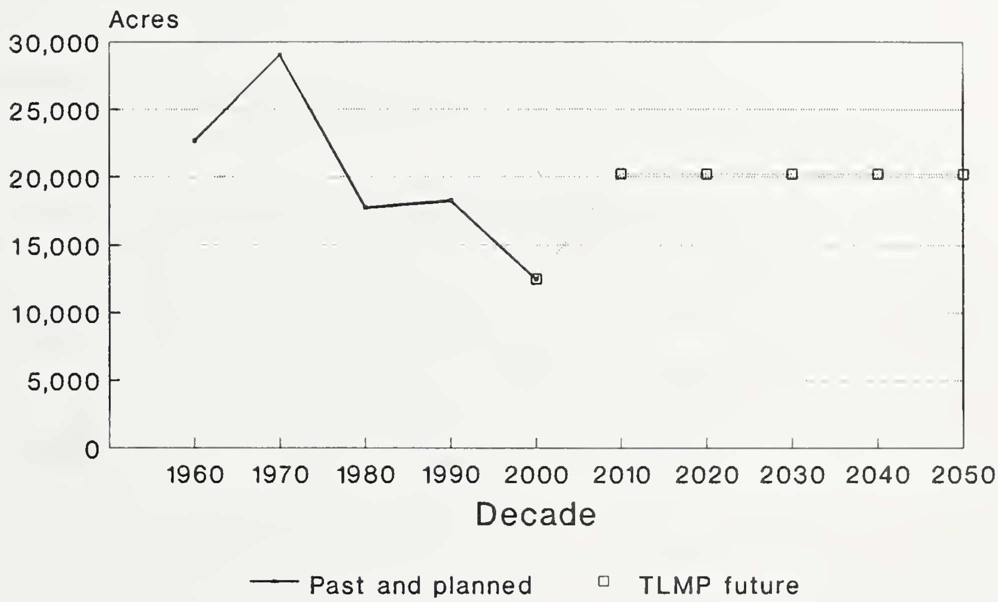


Figure 3-67
Average Decadal Harvest for Coffman Cove

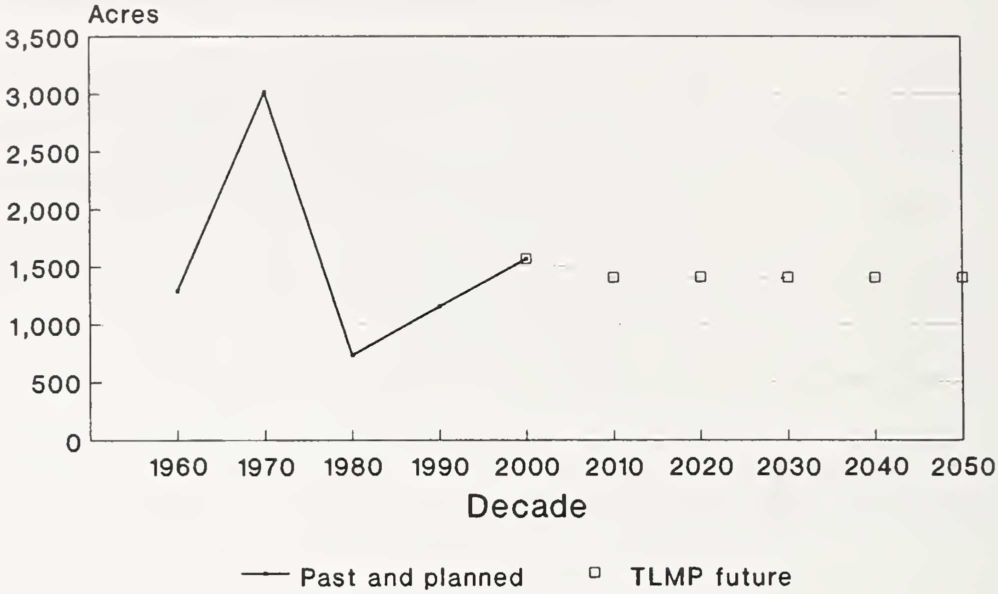


Figure 3-68
Average Decadal Harvest for Naukati

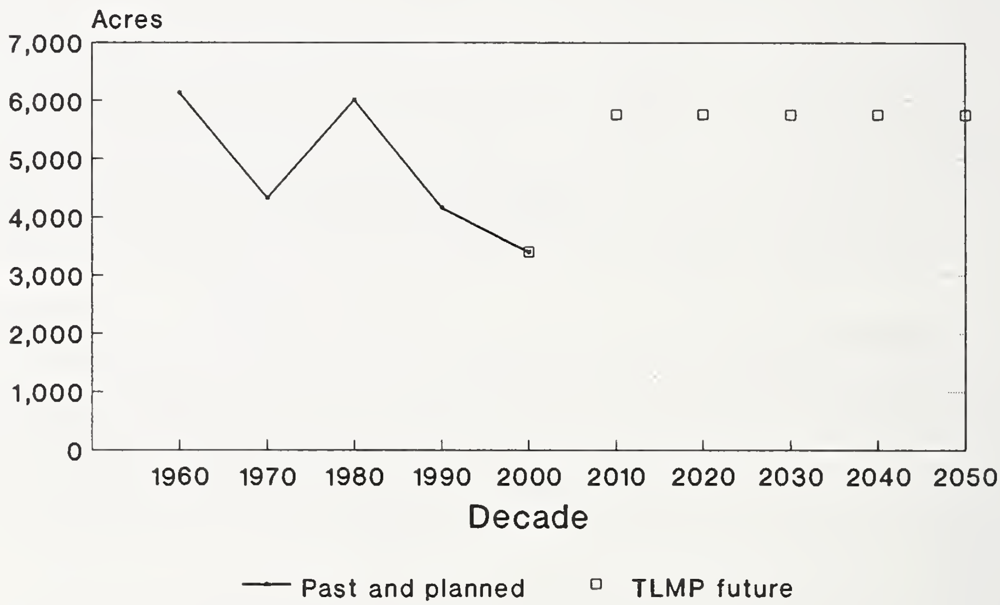


Figure 3-69
Average Decadal Harvest for Thorne Bay

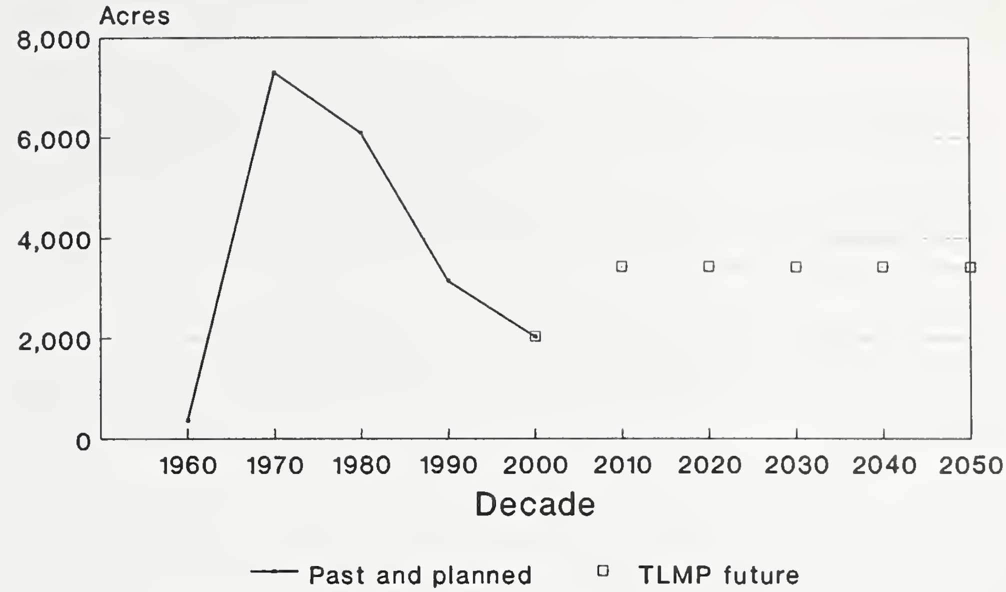
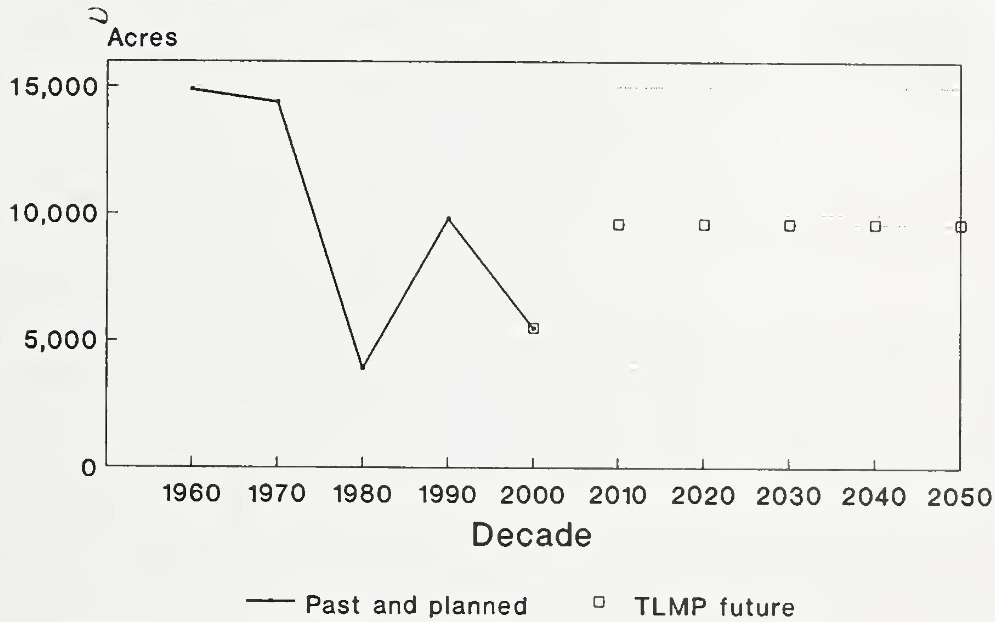


Figure 3-70
Average Decadal Harvest for Whale Pass



Commercial Fishing Employment

In estimating jobs associated with commercial fishing, the assumption is that two-thirds of the total fish production in Southeast Alaska is salmon and that 80 percent of the salmon originate from National Forest lands. The result is that 2,505 of the 4,727 current jobs related to commercial fishing are assumed attributable to the Tongass. It is also assumed that these 2,505 jobs change at the same rate as the commercial fish habitat capability on the Forest. Timber harvest and related activities have no measurable effect on fish under the current standards and guidelines and management area prescriptions (see Fisheries section of this chapter). Commercial fish habitat capability would remain constant at 22.4 in all alternatives. Consequently, commercial fish related jobs attributable to the Project Area are estimated to remain constant at 507 jobs in all alternatives.

Recreation And Tourism Employment

Many Forest Service actions affect tourism. Tourism needs can be grouped around consumable resources (fish, wildlife, minerals, etc.) and non-consumable resources (scenic vistas, bird/eagle watching, etc.). Forest Service standards and guidelines in addition to TTRA stream buffer requirements are designed to protect the visual components of the resources such as fish stream corridors or the scenic corridor along a ferry route. These same mitigation measures are intended to maintain the critical habitats of both commercially important and non-commercial species which contribute to the enhancement of the tourist experience. This means that wildlife and fisheries biologists are involved in the identification and protection of important habitats and corridors, and that landscape architects are an integral part of the planning team, ensuring that timber management activities meet strict visual guidelines.

Based on communication with businesses in Klawock and Craig, most of the tourist influx on POW is attributable to the sport fishery located on and around the island. Comments indicate a 15–20 percent year-to-year increase in tourism and tourism-related spending over the past four years. These businesses report at least an approximate 30 percent increase in sport fishing based tourism over the past two years. The major portion of that sport fishing reportedly is ocean based, with a smaller portion occurring along freshwater streams.

The Fisheries Section of Chapter 3 identifies several fisheries enhancement projects that would contribute to the overall health of the sport fishing (tourist) industry on POW Island. The CPOW DEIS states that, "Present and future habitat capacity for Coho Salmon is unchanged, (and) there is a 2.5 percent increase for Pink Salmon. Forest Service enhancement projects on POW, in conjunction with cooperators and its partners, have introduced 19 miles of additional stream habitat and 925 acres of lake habitat, through fishpass construction and barrier falls modification."

Forest Service timber management activities have developed an extensive road system that may attract tourism and can contribute toward future economic diversity opportunities. Such opportunities may be enhanced through maintenance of a timber products industry that can complement and co-exist with other multiple-use resource developments.

Recreation and tourism jobs were not estimated for this analysis because of the limited size of the Project Area. Recreation and tourism employment are more appropriately analyzed at the Forest Plan level where overall supply, demand, use, and availability of substitutes can be taken into account. This project does not affect recreation use or employment in a manner significantly different than estimated in the TLMP Draft Revision. Therefore, the overall recreation and tourism use and

employment estimated for the Project Area in the Forest Plan Revision will apply to all alternatives.

Sport Hunting

The Subsistence section in Chapter 3 includes findings that all of the proposed alternatives (including the no-action alternatives) may have a significant possibility of a significant restriction of subsistence use of deer for Coffman Cove, Craig, Hollis, Hydaburg, Klawock, and Thorne Bay. This finding is based on reductions of habitat capability for the Project Area as predicted by computer models. Because subsistence users have a priority for use of subsistence resources, this may lead to restrictions on sport hunting for some geographic areas.

Any future restrictions imposed by the Federal Subsistence Board on sport hunting of deer could have an effect on the incomes of those communities that provide goods and services to the visiting non-subsistence deer hunter. Deer hunter expenditures within individual POW communities are not currently quantifiable.

Cumulative Effects

Cumulative effects on employment are displayed in the TLMP Draft Revision (1991a), Alternative P. This analysis indicates that for the Ketchikan Area as a whole, National Forest system timber and commercial fishing employment will remain fairly constant, while recreation and tourism employment will increase in the future. The TLMP Draft Revision also concludes that the CPOW Project Area's contribution to total National Forest system timber employment will remain unchanged though the middle of the 21st century. Afterwards employment may increase as second-growth timber becomes available for harvest.

Net Cash Flow and Payments to State: Affected Environment

Table 3-134 shows the total receipts from the Ketchikan Area timber program and payments to the State of Alaska. Twenty-five percent of all monies received (including purchaser road credits) from the Ketchikan Area is paid to the State of Alaska. The funds are generally used to benefit public schools and public roads. The amount of funds contributed in the past have not comprised a significant portion of the total public school and public road budgets for the cities and boroughs of Southeast Alaska.

Table 3-134
Ketchikan Area Receipts and Payments to the State Of Alaska, FY 1980-1990

Fiscal Year	Receipts *1	Payments to Alaska
1980	26,024,494	6,506,124
1981	15,007,944	3,751,986
1982	21,622,764	5,405,691
1983	5,365,915	1,341,479
1984	4,063,189	1,015,797
1985	209,231	52,308
1986	1,967,240	491,810
1987 *2	-2,033,575	---
1988	1,232,672	308,168
1989	20,183,133	5,045,783
1990	35,544,272	8,886,068
Total	129,187,278 *3	32,805,213

*1 Capital investments such as permanent roads, bridges, log transfer facilities, and timber stand improvements also contribute to the total assets of the Tongass National Forest, reduce future management costs, and are scheduled to achieve management objectives described in the Tongass Land Management Plan.

*2 Tongass receipts for fiscal year 1987 were negative as a result of Comptroller General Decision B-224730 of March 31, 1987 to retroactively implement the emergency rate redeterminations for short-term sales. Without the reduction, Tongass receipts would have been positive by $2,139,943. As a result of the negative receipt, no payments to the State were made in 1987.

*3 Does not include receipts foregone as a result of the Federal Timber Contract Payment Modification Act. Estimated total value of affected contracts was approximately $54.5 million prior to the Act if all volume were harvested. Total value of the affected contracts as a result of the Act was approximately $1.2 million. The difference of $53.3 million represents receipts foregone, thus, the total Tongass receipts for the period fiscal years 1980-88 would have been $126.8 million.

SOURCE: ANILCA 706(a) Draft 1988 Supply and Demand Report Number 8, and 1990 Timber Sale Program Information Reporting System (TSPIRS).

Net Cash Flow and Payments to State: Effects of the Alternatives

Dollar payments to the State of Alaska are based on the 25 percent formula for uses of the Tongass land and resources that generate income for the Federal government. Ninety-nine percent of the payments to the state from Federal receipts are generated from timber sales. Money returned to the state is earmarked for use on public schools and roads. When money returns drop, the state must come up with other sources of revenues to maintain the same quality and quantity of school and road programs. This, in turn, may decrease the money available for other programs.

Table 3-135 displays payments to the State of Alaska by alternative. Under anticipated mid-market conditions, Alternatives 1 and 1a would not generate any payments to the state, while Alternative F3 would generate up to $6 million. These alternatives represent the range within which the other alternatives fall.

Table 3-135
Payments to State of Alaska, by Alternative, in Thousands of Dollars

	Alternatives						
Year	1	1a	F2	F3	F4	F5	F6
1993	0	0	446	539	418	412	397
1994	0	0	1,289	1,558	1,207	1,189	1,149
1995	0	0	1,338	1,617	1,254	1,235	1,193
1996	0	0	1,884	2,277	1,765	1,738	1,679
TOTAL*	0	0	4,957	5,991	4,644	4,574	4,418

* Based on mid-market rates, timber reciepts, and purchaser credits for road construction.

Table 3-136 displays the estimated fiscal impact of the CPOW project. The mid-market value (average pond log value of timber harvested 1980-1988) of the timber which could be offered in each alternative was compared with the estimated costs (capital investments plus operating expenses) of the project. The table displays the anticipated total revenue, total costs, and net revenue in 1990 dollars, volume harvested, and net return per MBF. The project is anticipated to produce negative net revenues for all alternatives including the no-action alternatives.

Table 3-136
Estimated Fiscal Effects of the CPOW Project (First Decade Average)

		Alternatives						
Item	Units	1*	1a*	F2	F3	F4	F5	F6
Costs	$1,000,000	2.0	2.0	11.0	10.9	10.8	11.0	10.9
Revenues	$1,000,000	0.0	0.0	.9	.6	.3	1.0	.2
Net Revenues	$1,000,000	-2.0	-2.0	-10.1	-10.3	-10.5	-10.0	-10.7
Harvest	MMBF	0.0	0.0	268.0	264.0	261.0	267.0	263.0
Net Revenue Per MBF	$/MBF	NA	NA	-37.67	-39.02	-40.23	-37.45	-40.68

*Cost includes estimated expenses of EIS preparation over a two-year period. Additional costs could be incurred if the no-action alternative results in a breach of the Long-Term Contract.
SOURCE: USDA Forest Service FORPLAN Analysis.

Cumulative Effects

The cumulative effects on net cash flow and payments to the state are displayed in the TLMP Draft Revision (1991a), Alt.P. This analysis indicates that for the Ketchikan Area as a whole, the timber program will provide a positive return before payments to the state. However, the CPOW Project Area's contribution to total payments to the state will decline in the near future as the supply of old growth available for harvest is reduced. In the long term, payments to the state may once again increase as second-growth timber becomes available for harvest.

Economic Efficiency: Affected Environment

The National Forest Management Act of 1976 (NFMA) set forth explicit requirements for economic efficiency analysis of Forest management proposals. While economic efficiency must be analyzed and considered, it is not the sole decision criterion. Although the Forest Service has generally tried to achieve cost-efficient management (lowest possible cost per unit of output), systematic evaluation of all costs and benefits from practices and activities has been undertaken only in recent years.

The measure of economic efficiency applied in formulating and evaluating alternatives is Net Public Benefits (36 CFR 219.1(a) and 219.12(f)). Net Public Benefits (NPB) are the sum of Present Net Value (PNV) and non-priced commodity values. PNV is the difference between the discounted value of all outputs to which monetary values or established prices are assigned and the total discounted costs of managing the area. Examples of non-priced benefits include scenic quality and wildlife habitat.

Economic Efficiency: Effects of the Alternatives

Table 3-137 displays the economic efficiency of each alternative, or the difference between benefits and costs associated with the alternatives. This table summarizes the changes in present net value between alternatives, and ranks the alternatives in order of descending PNV. Present Net Value is derived from: stumpage rate (see Table 3-52, in the Timber section of this chapter), harvest volume, miles of specified, temporary and reconstructed roads, sale preparation and administration costs, EIS costs, road survey and design, and estimated revenue.

Table 3-137
Present Net Value Comparison of Alternatives

Alternative	Present Net Value (dollars)
1	-1,923,077
1a	-1,923,077
F5	-7,819,356
F3	-8,061,100
F4	-8,325,610
F6	-8,443,351
F2	-9,755,834

Timber Demand Analysis: Affected Environment and Effects of the Alternatives

Ketchikan Area Timber is traded in the Pacific Rim Market. Over 90 percent of the wood pulp produced in Alaska is exported. The solid wood products (logs, cants and lumber) are shipped to Japan, Korea, The Peoples Republic of China, Taiwan, and Canada. The dissolving pulp produced from the hemlock and lower grade spruce logs is shipped to a wider array of countries. For example, in 1988, pulp products were shipped from Alaska to Argentina, Austria, Bangladesh, Belgium, Bulgaria, China, Egypt, France, West Germany, India, Indonesia, Iraq, Japan, and six other foreign countries. Approximately 15 percent of the dissolving pulp produced in Alaska is shipped to destinations in the continental United States. The Pacific Rim demand for wood products far exceeds the productive capability of the Ketchikan Area. The Ketchikan Area is a very small player in a very large market. It is anticipated that the Pacific Rim market will be able to purchase all the wood products which can be supplied.

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TRANSPORTATION AND FACILITIES

Key Terms

Access Management - aquiring rights and developing and maintaining facilities needed by people to get to and move through public lands
A-Frame LTF - log transfer facility system which consists of a stationary mast with a falling boom for lifting logs from trucks to water. This system is generally located on a shot rock embankment with a vertical bulkhead to access deep water, accommodating operations at all tidal periods.
Aquatic Habitat Management Unit (AHMU) - a mapping unit that displays an identified value for aquatic resources; a mechanism for carrying out aquatic resource management policy
Arterial Roads - roads usually developed and operated for long-term land and resource management purposes and constant service
Chain-slide LTF - log transfer facility system which consists of a gravity slide ramp for sliding log bundles into the water, with a chain assist system to slow the velocity of the logs entering the water.
Collector Roads - collect traffic from Forest Local roads; usually connect to a Forest Arterial road or public highway
Local Roads - provide access for a specific resource use activity such as a timber sale or recreational site; other minor uses may be served
Log Transfer Facility (LTF) - a facility that is used for transferring commercially harvested logs to and from a vessel or log raft, or the formation of a log raft

Affected Environment

Introduction

The transportation system on Prince of Wales Island evolved almost entirely from the harvest of timber products. Extensive road systems were started at Hollis and Coffman Cove by the Ketchikan Pulp Company (KPC) beginning in the mid-1950's. In 1962, KPC operations at Hollis were moved to Thorne Bay. Since 1962, other transportation systems were developed from logging camps at Thorne Bay, Ratz Harbor, Whale Pass, Labouchere Bay, El Capitan, Naukati, Winter Harbor, 12-Mile Arm, and Polk Inlet. In the early 1980's, tie roads were constructed to connect to Labouchere Bay, Whale Pass, Naukati and Coffman Cove.

The Forest Transportation System includes three types of roads: Arterials, Collectors and Locals. Arterial and Collector roads are usually maintained for use by passenger vehicles and are normally designed for higher truck speeds than Local roads. Most Local roads are not designed to accommodate passenger vehicles. Construction of Local roads for timber harvesting activity occurs on Prince of Wales Island at rate of between 50 and 80 miles per year. In addition, 20 to 30 miles of Local road are reconstructed annually.

The transportation system of the CPOW Project Area can be broken into four categories: (1) State Highways; (2) Forest Development Roads; (3) Log transfer Facilities; and (4) Trails.

State Highways

There are 78 miles of State Highway administered and maintained by the Alaska Department of Transportation on Prince of Wales Island. State Highway 924 connects to the Alaska Ferry terminal at Hollis, and to the communities of Klawock and Hydaburg. Highway 929 connects Craig and Klawock and continues north past the Control Lake Junction to Thorne Bay.

Forest Development Roads (FDR)

There are 1,478 miles of Forest Development Roads (FDR) on Prince of Wales Island, approximately 517 miles of which are within the Project Area. Approximately 87 miles can accommodate all vehicle types, and 430 miles are limited to high ground-clearance vehicles.

National Forest roads in the CPOW Project Area are constructed to standards appropriate for timber harvest, considering safety, cost of transportation, and impacts on lands and resources. The Arterial and Collector road systems on Prince of Wales Island are virtually complete, although minor additions to the system may be made, depending on the selection of harvest areas and log transfer facility permit approvals. The Arterial/Collector system roads have been constructed to a single lane width with turnouts and with rough shot rock surface, but built wide enough to accommodate future crushed gravel surfacing. They are designed for heavy off-highway loads.

Under some alternatives the transportation system shows extending FDR 30 northwest of the Sweetwater Lake area toward Whale Pass. FDR 30 road location falls within one of the transportation corridors under consideration as a Forest Highway between the Coffman Cove intersection and the north end of the island. The Federal Highway Administration, the Alaska DOT/PF, and the USDA Forest Service agreed that the corridor would be considered for inclusion through the Forest Highway Program to be a State Highway. The Direct Federal Division of the Federal Highway Administration has initiated the environmental analysis for the effects of alternative routes in 1993. The forest roads connecting Hollis, Hydaburg, Klawock, Craig, and Thorne Bay were reconstructed to State Highways through the Forest Highway Program.

The possibility of reconstruction to State Highways through the Forest Highway program in itself should not substantially affect the CPOW project. To the extent economically possible, FDR 30 will be located on an alignment that will accommodate a 30 mph single lane road to act as a “pioneer road” for the proposed Forest Highway. Major drainage structures along this road segment will be located to accommodate required structures for State Highway standards. Experience has shown that there are significant environmental and economic savings in preparing for the possible upgrade of the road system.

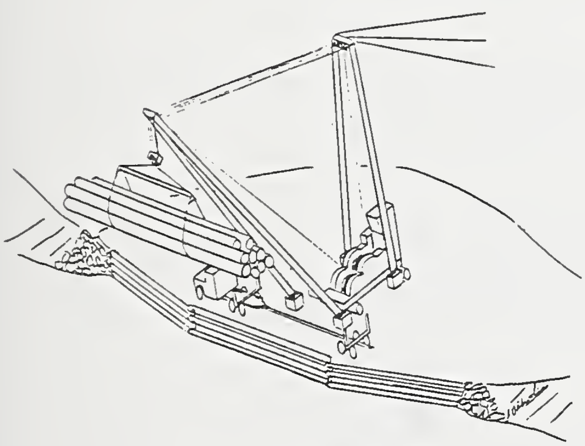
The State of Alaska, the Federal Highway Administration, and the USDA Forest Service are cooperating to reconstruct the Forest Development Road from Control Lake to the Coffman Cove intersection. Reconstruction on this road is ongoing and is expected to be completed during the life of the CPOW project.

Log Transfer Facilities

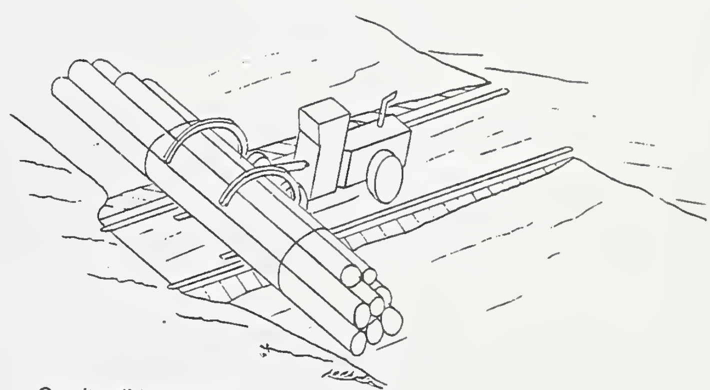
The transportation of harvested timber on Prince of Wales Island to the KPC mill at Ward Cove on Revillagigedo Island generally requires that the log bundles be removed from the log trucks, placed in the water, rafted to the sort yard at Thorne Bay (or trucked directly to the Thorne Bay facility), and finally rafted to the mill at Ward Cove. The cost of timber transport by way of log trucks is more expensive than the cost of rafting and towing. For this reason, Log Transfer Facilities (LTF's) have been constructed in the past at various locations around the Project Area. There are now five existing LTF's and one abandoned facility that have transported National Forest system timber on the Project Area (see separate map packet).

The five currently active LTF's are sufficient to service all timber that would be harvested by this project. No new LTF's are proposed for development.

The existing facilities at Naukati, Whale Pass, Coffman Cove, and Winter Harbor use the A-Frame method of transferring logs to the water. The Thorne Bay facility consists of a gravity slide ramp for sliding log bundles into the water, with a chain assist for slowing the velocity of bundles entering the water. Ketchikan Pulp Company is the permitee for the Coffman Cove, Naukati and Thorne Bay sites.



A-Frame LTF



Gravity-slide ramp LTF

Trails

There are currently five miles of inventoried trail on the Project Area. Trail management will take advantage of opportunities created by other management activities. All new trail construction or major reconstruction will be covered by separate NEPA documents.

Effects of the Alternatives

This section analyzes the effects of the alternatives upon the development and management of the Forest road system and the effects of LTF's on marine resources. The effects of the transportation system on other resources are considered in depth in the sections relating to those resources (soils, water, visuals, fisheries, wildlife, etc.). This section focuses on the effects of each alternative on the transportation system, and will be grouped into the following categories: (1) Construction and Costs, (2) Road Development, (3) Access Management, (4) Log Transfer Facilities. The analysis of the effects of the alternatives on LTF's also includes a discussion of the effects of LTF's on the marine benthic environment.

Road development patterns are similar from one alternative to another because of the location of the resource being used, terrain characteristics, and development costs. Roads are located to minimize disturbance on the resources, yet provide access to resources. Thus, road locations generally follow routes of favorable terrain where practicable.

Construction and Costs

The estimated development costs for each alternative are summarized in Table 3-138

Table 3-138
Transportation Miles and Costs by Alternative

	1	1a	F2	F3	F4	F5	F6
New Construction Miles							
Arterial	0	0	3.1	3.1	3.1	4.1	3.1
Collector	0	0	0	14.3	5.6	0	0
Local	0	0	107.0	117.8	95.4	95.4	98.7
Total Construction MM$	0	0	16.6	21.1	16.0	15.1	15.4
Heavy Reconstruction Miles	0	0	25.7	22.9	26.2	25.6	23.6
Light Reconstruction Miles	0	0	52.1	46.6	53.2	52.3	48.0
Total Reconstruction MM$	0	0	2.0	1.8	2.0	2.0	1.8
Bridge Construction/Reconst.							
Total Bridge Const. M$	0	0	98	70	70	70	98
Total Construction and Reconstruction Costs MM$	0	0	18.7	23.0	18.1	17.2	17.3

MM$ = Millions of Dollars
M$ = Thousands on Dollars

Road Development

Road development includes the expansion of the current road system in all alternatives except Alternatives 1 and 1a.

In general, changes in the road system are needed because of the amount and spatial arrangement of resource areas and the amount of harvesting that would occur in new undeveloped areas. Proposed new roads are needed to harvest the timber volume associated with each respective alternative. The total planned roads, new and existing, are the roads needed to harvest the timber volume associated with each alternative (see Table 3-139).

Table 3-139
Changes in Total Transportation System (Miles) by Alternative

	1	1a	F2	F3	F4	F5	F6
Existing Roads* 89–94	517	517	517	517	517	517	517
CPOW Specified Roads	0	0	110	135	104	99	102
Total Planned Roads	517	517	627	652	621	616	619

* Approximate existing miles; includes private roads.

Expansion of the road system requires: (1) construction of varying classes of roads (Arterial, Collector, and Local); (2) reconstruction of some existing roads; (3) construction and reconstruction of varying types of major drainage structures; and (4) coordination of construction activities with fish and wildlife needs.

Construction

Three classes of road would be constructed as part of the proposed project, each of which has different projected uses and construction standards. The three classes are: Arterial, Collector, and Local roads. Temporary roads, which are short-term roads for timber harvest activities only, were considered Local roads for analysis purposes since these roads are similar to Local roads.

Arterial and Collector roads are generally mainline system roads requiring higher standards and heavier investment to provide prolonged multiple use. These roads can be built to lower standards initially and upgraded as use is intensified. Thus the Forest Service may construct Arterial and Collector roads to low or medium standards depending upon use.

Local roads tend to be utilized intermittently allowing use of lower standards. Thus Local roads are generally less costly than the Arterial and Collector roads. These roads may have use restrictions during harvest activities that limit public access.

The development of the Arterial/Collector/Local road system occurs in all alternatives except Alternatives 1 and 1a, the no-action alternatives. Alternative F3 develops the most miles (135), while Alternative F5 develops the fewest (102 miles). Local roads will be constructed in all action alternatives. The level of Local road development is

not directly proportional to the level of harvest in each alternative, because of differing spatial arrangements of the harvest units between alternatives.

Alternative F3 contains the highest level of development, and has the highest total costs. Alternative F5 contains the lowest level of development and the lowest total cost. The miles and cost of roads to be developed are shown by class in Table 3-138.

Reconstruction

There is reconstruction of existing roads associated with all action alternatives. Reconstruction activities range from major realignment and bridge replacement to minor blading and shaping of the existing road from proposed harvest units to the existing log transfer facilities.

Table 3-140 displays bridge and major culvert costs.

Table 3-140
Bridge/Major Culvert Cost by Alternative

	1	1a	F2	F3	F4	F5	F6
Construction/Reconstruction (Number of Structures)							
Permanent	0	0	0	0	0	0	0
Modular	0	0	4	2	2	2	4
Major Culvert	0	0	2	2	2	2	2
Construction Cost ($M)							
Permanent	0	0	0	0	0	0	0
Modular	0	0	56	28	28	28	56
Major Culvert	0	0	42	42	42	42	42
Total Bridge Cost ($M)	0	0	98	70	70	70	98

Costs of replacing or repairing bridges are factored into reconstruction costs.

Construction Coordination with Fish and Wildlife

Development in some areas may require road construction or reconstruction near inventoried eagle nest trees. There is no road construction anticipated to be within 330 feet of any known eagle nest tree in the Project Area. It is standard practice to locate roads and other facilities at least 330 feet away from eagle trees unless terrain or physical requirements such as road grade prevent such an avoidance.

Some stream crossings have been identified as needing fish timing restrictions for construction of structures, to minimize impacts on fish eggs and fry. Generally these restrictions can be accommodated through planning and scheduling of the construction activities. However, in many cases, additional costs would be incurred to accommodate the timing restrictions. Such costs would include additional equipment mobilization and demobilization, increased construction actions for mitigation, and increased construction delays. The number of crossings, the acres of AHMU buffers affected by road crossings, and the number of crossings with fish timing and/or passage restrictions are displayed in Tables 3-141 and 3-142.

Road Construction Within Stream Buffers

For a discussion of stream buffers, see Chapter 2, Mitigation Measures. Roads are put in stream buffers only where it is the environmentally preferable choice and where it is consistent with safety. When these roads are laid out on the ground, care will be taken to keep as much of the road as possible outside of the stream buffer. In most cases, the limiting factor will be the type of terrain adjacent to the buffered stream which will govern how much of a given road segment can be located outside the buffer. This is consistent with the Tongass Timber Reform Act (TTRA).

Effects of road construction and reconstruction are analyzed for all CPOW action alternatives.

Table 3-141
AHMU Stream Crossings, Construction and Reconstruction, in Number of Crossings and Acres of Buffer Affected by Alternative

	1	1a	F2	F3	F4	F5	F6
New Construction							
AHMU Class I	0	0	38	29	28	13	27
AHMU Class II	0	0	16	34	19	15	22
AHMU Class III	0	0	90	88	71	104	103
Reconstruction							
AHMU Class I	0	0	5	5	2	6	6
AHMU Class II	0	0	2	1	3	2	2
AHMU Class III	0	0	11	8	6	9	9
Total Crossings	0	0	162	165	129	149	169
AHMU Buffer Acres Affected	0	0	49.6	52.3	40.17	51.3	51.7

Table 3-142
Number of Crossings With Fish Timing and/or Passage Restrictions

	Alternatives						
	1	1a	F2	F3	F4	F5	F6
Timing	0	0	99	107	83	79	101
Passage	0	0	54	63	47	27	49

Access Management

Access management (AM) is the management of existing and proposed Forest roads within the Project Area. The Access Management maps as presented in the 89-94 LTS EIS, Option B, portray generic areas representing varying road management strategies for those areas. The Access Management map from the LTS EIS is available in the Planning Record. A schematic representation is shown in Figure 3-71.

The strategies are described in the subsequent access management AM classes. "Traffic Service Level" goals are included in the AM classes, and describe significant traffic characteristics and operating conditions for a road. A description of the Traffic Service Levels is located in the Planning Record. There will be no Traffic Service Level for temporary roads as these roads will be used only for timber harvest activities then closed by physically obliterating a portion of the roadway to prevent any type of vehicle access. Remain-open temporary roads may be used to provide short-term access for the Forest Service to perform silvicultural activities.

Table 3-143
Miles of Existing Roads on Project Area

Road Class	Miles Existing	New Roads*	Miles Closed
Arterial	88	4.1	0
Collector	107	-	8.7
Local	214	95.4	28.4
Temporary	108	5.3	53.3

* Alt. F5

In many instances, State, municipal, and private lands were not indicated on the Access Management Maps for display simplicity and concept purposes. The Access Management classes indicated on the maps are applied only to the Forest Service lands in the Project Area.

Access Management Classes

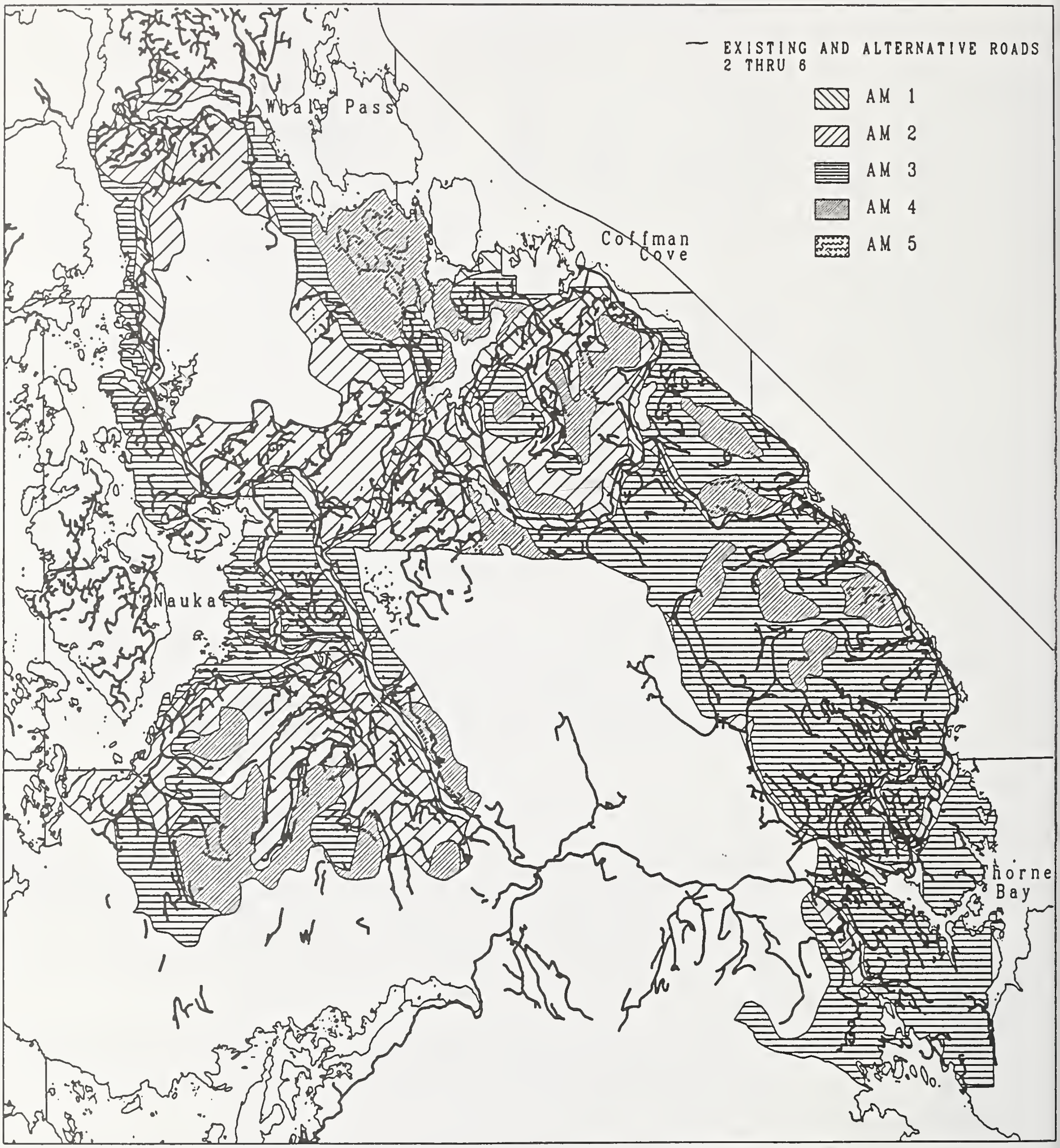
AM Class I. *Description* - AM 1 refers to mainline (Arterial) roads on the Project Area. Key roads in this category are the Control Lake to Thorne Bay road; the Thorne Bay to Ratz Harbor road; Forest Development Road (FDR) 20 from Control Lake to Neck Lake; the junction of FDR 20 and FDR 23 to Coffman Cove, including the loop road past Luck Lake; FDR 2060 from the junction of FDR 20 to Naukati; FDR 25 and FDR 30 to Whale Pass. All highways under the jurisdiction of the Alaska State Department of Transportation are included in this class. Continuous year round community access is a major component of traffic on these roads. The long-term Forest Service goal is to turn most of these roads over to the Alaska State Department of Transportation. This State agency is charged with providing public access to communities. It is also the only State or Federal agency with authority to plow snow for year round community access.

Prescription - Mainline roads within this class will have constant activity over a long period of time and will be managed to provide full service to the public. These roads are subject to safety conditions set forth in the Highway Safety Act. Use levels generally do not fluctuate significantly from year to year, and design criteria for roads, bridges and culverts will be applied to maintain long-term access. Maintenance levels also do not fluctuate significantly from year to year, and will be set at levels consistent with projected use. Mainline roads will not be closed. All Local roads that juncture with the mainline roads will be subject to closure unless otherwise specified to be left open in the Road Management Objectives.

AM Class 2. *Description* - AM 2 areas have generally been open to public access in the past. Varying public uses—including hunting, fishing, motorized camping and wood gathering—have been established as a result of harvest roads being left open.

Prescription - Road systems within this class are projected to have intermittent levels of activity which fluctuate significantly from year to year. Permanent drainage structures will be installed to meet long-term access objectives; however, maintenance

Figure 3-71
Access Management Schematic Map



levels fluctuate in response to changing use levels. During periods of limited use, maintenance standards are sufficient to provide only for public safety and resource protection. Motor vehicle traffic may be restricted or reduced to prevent conflicts during harvest activity. Arterial roads will not be closed. Collector roads will remain open, but traffic may be controlled during harvest activities. Portable bridges used on Collector roads, to reduce construction/reconstruction costs, will be removed at the end of harvest activities. Local roads will be subject to closure depending on resource needs.

AM Class 3. *Description* - AM 3 is applied to areas containing key fish and wildlife habitat. These areas require access limitations to minimize disturbance to habitat areas. Hunting, hiking, fishing and other dispersed recreation activities are expected in these areas.

Prescription - Road systems within this class will have intermittent levels of activity with extended periods of non-use. All Collector roads will remain open, but traffic may be controlled during harvest activities. Intermittent closures (seasonal or up to several years) will be applied to Local roads to meet the objectives of providing non-motorized recreation activities, and avoiding impacts from poaching or increased hunting and fishing pressure on key wildlife and fish habitats. Portable bridges may be used to reduce construction costs. These structures will be removed during periods of non-use. Predominant public use of the Local roads after closure will be foot traffic. The location, type, and length of closure will be determined prior to construction.

AM Class 4. *Description* - AM4 areas are important because they are one or more of the following: deer summer ranges, areas currently identified as primitive recreation areas, key estuary areas, or key recreation areas. They include such areas as Gold and Galligan Lagoon and the Karta LUD I release area.

Prescription - Road systems within this class will have intermittent levels of activity with extended periods of non-use. Traffic will be for motor vehicle use associated with harvest activity. Public vehicle traffic will be prohibited. Public access will be predominantly foot traffic.

Design criteria will be consistent with the objective of maintaining intermittent access. Within this area, low standard roads would generally be constructed. When in use, maintenance standards will be consistent with levels of use. Once the accessing activity has been completed, portable bridges will be removed from all roads.

Arterial and Collector roads will be constructed and maintained to accommodate intermittent harvesting activities. Permanent or portable bridges will be used. Public motor vehicle traffic will be prohibited when resource concerns warrant closure.

Local roads will be closed when intermittent harvest activities are completed. Portable bridges will be removed after harvest activities are completed.

AM Class 5. *Description* - TLMP LUD II designation (see Glossary) . These lands will be managed in a roadless state, retaining their wildland character. Primitive recreation facility development is permitted. Excluded uses are: (1) roads, except for specifically authorized uses, and (2) timber harvest, except to protect resource values or control insect infestation.

Exceptions. There may be unforeseen exceptions for some roads within the various "AM" classes. For example, disposition or development of state or private lands may

require continuous access through Forest Service lands within an area indicating closure of all roads. The continuous access may be granted, especially if other routes are not feasible. Such situations will be evaluated on a case-by-case basis.

Road Closures

Road closures are executed for numerous reasons. Some examples are fish and wildlife protection, public safety, and inadequate maintenance funding levels. It may be necessary to close roads or portions of roads to specific uses. Roads under Forest Service jurisdiction can be closed by authority of CFR 36, ch.11, parts 212.7 and 261.

Roads closed by the Access Management plan will also be closed to all motorized vehicles including motorcyles, 3-wheelers, 4-wheelers, and snowmobiles unless otherwise noted in the road management objectives. Physical closure of the road will be by gate, earth barrier (tank trap), rock barrier or vegetative closure.

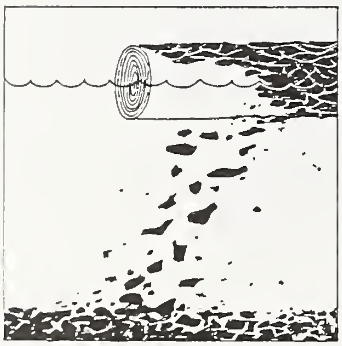
Road Location/design cards, located in Appendix G, outline the basic road management objective for each road in the Project Area.

Access Management Option B as presented in the Ketchikan Pulp Company 1989-1994 EIS would provide the basis for the new Access Management Plan. Some changes would be made to the 1989-94 Option B plan to reflect site-specific management direction (for example, some gated roads may remain open). The implementation of this plan would retain areas designated to be open in the KPC 1989-1994 EIS and close many new areas being accessed.

Log Transfer Facilities (LTF's)

LTF's Required for the Alternatives

Existing Log Transfer Facilities (LTF's) would be required to harvest the timber scheduled in the alternatives. All alternatives would continue use of five existing sites except Alternatives 1 and 1a. There is no need for new LTF sites to be constructed for any of the alternatives. The USDA Forest Service is the permit holder for all LTF sites to be used, with the exception of the Coffman Cove, Naukati, and Thorne Bay LTF site permits, which are held by Ketchikan Pulp Co.

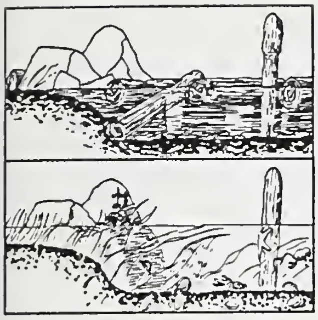


Work would be necessary on some existing facilities to ensure environmental and safety requirements are met. This work would be done on an as-needed basis.

See separate map packet for locations and types of LTF's required to harvest timber in the alternatives.

Effects of Log Transfer Facilities on Marine Benthic Environment

During the transfer of logs from land to water, bark is sloughed off and may be deposited on the ocean bottom; bark also is continually sloughed off by agitation by wind and waves while the logs are in rafts. If the bark accumulates on the bottom, it can diminish habitat for bottom-dwelling crustaceans and molluscs, as well as hamper underwater vegetation used as food and rearing sites for marine fish and other organisms. In 1985 it was determined that discharge of bark into the water at an LTF was a discharge requiring a National Pollution Discharge Elimination System (NPDES) permit. The affected benthic environment under all proposed CPOW



alternatives would continue to be the same as that affected by the existing LTF's, since no new LTF's are being proposed in this project.

Log transfer facilities would affect the marine benthic habitat (plants and animals that live in and on the bottom). Marine benthic habitat impacts are expected to be as follows:

1. Structural Embankment: Estimated 0.23 acres affected per site.
2. Site Bark Deposition: Estimated 1.96 acres affected per site.
3. Raft Storage Bark Deposition: Unknown.

Structural Embankment. All LTF types occupy approximately the same amount of bottom area. For instance, the float off-push in a 10 percent grade system extends approximately 250 feet out into the water on a moderately sloped beach. This system is thus long and narrow. The slide and A-frame systems use more shoreline, and do not protrude out into the water as much as the float off-push in system. All systems, therefore, cover about the same bottom area, but in different configurations.

Site Bark Deposition. Two publications describe some of the general effects of log transfer facilities and log storage on the marine bethnic habitat. Sedell and Duval (1985) summarize the information available on the effects log transport and storage on marine resources and fisheries. Faris and Vaughn (1985) examined log transportation and log storage in Southeast Alaska.

Shultz and Berg (1976) examined 32 existing log transfer facility sites and found that 19 had bark accumulation, 8 had no bark accumulation, and 5 had traces of bark. The extent of bark accumulation ranged from 0 to 9.0 acres for 31 of the 32 sites. The 32nd site had accumulation of 182 acres that could not solely be attributed to log transfer activities. Faris and Vaughn (1985) reexamined the original data from Shultz and Berg (1976) and found that the average accumulation size was 1.96 acres for all sites excluding the 182-acre site. They speculate that bark and debris accumulation may be decreasing over time due to currents. No estimate was made on the length of time before bark accumulation was completely eliminated.

Faris and Vaughn (1985) also examined the extent of total damage to the marine benthic habitat in Southeast Alaska. Their results indicate that from the 90 currently permitted sites, a total of 176 acres would be affected (using the 1.96 acre average). This is .02 percent of the total estuarine area that is less than 60 feet deep. Moreover, when they examined all of the potential area of bark and debris accumulation from all permitted and proposed sites in Southeast Alaska, including all sites considered in the KPC Long Term Sale 1989-1994 EIS, they found that a total of 317 acres would be affected. This is 0.09 percent of the total estuarine area that is less than 60 feet deep in all of Southeast Alaska. This result corresponds with the conclusions of Sedell and Duval (1985) that the evidence of damage on important marine populations (bivalves, crabs and salmonoids) was inconclusive because of the small area of impact due to log transfer facilities. This evidence resulted in development of the current siting guidelines—e.g., avoiding crab habitat, shallow areas at the heads of bay, etc.—and suggests that impacts would be minimal.

The major effect of bark and debris accumulation is that little neck clams and bay mussels have been shown to be eliminated when as little as 4 to 5 inches of bark accumulates (Freese and O'Clair 1987). Further, Colin and Ellis (1979) reported molluscs and several polychaetes were excluded by bark debris thicker than one inch, and that effects of bark may last several decades. From this evidence, it can be

assumed that other plants and animals that live in and on the bottom would probably be at similar risk.

Current LTF permits require monitoring of bark accumulations and possible removal at each site. EPA permits and BMP's require various measures to reduce the amount of bark entering marine waters. Under the NPDES General Permit for Storm Water Discharges Associated with Industrial Activity, EPA requires the development and implementation of a pollution prevention plan designed to reduce pollution at the source, before it can cause environmental problems.

Toxic substances leaching from bark can settle out in saltwater; therefore, these substances do not appear to be a major problem in open water where good circulation exists (Sedell and Duval 1985).

Certain dissolved substances (hydrogen sulfide and ammonia) recently have been shown to occur in open spaces between pieces of bark accumulated on the bottom (O'Clair and Freese 1988). O'Clair and Freese also note that it is not clear whether other toxic substances not measured in the study occur within bark accumulations. These substances do not enter the water above the bark. However, if dungeness crabs burrow into the bark deposit, it has been demonstrated that their reproductive ability, eating habits, and overall survival can be affected. It should be noted that this type of effect has been demonstrated in only one bark accumulation field (Rowan Bay log transfer facility) and that, in general, dungeness crabs were not found in bark accumulations at a number of other transfer facility locations. It is not known whether these effects would occur for other burrowing crab species. Although king crabs do not burrow, it is not clear whether this species is affected by bark and debris accumulation at log transfer facility sites.

Raft Storage Bark Deposition. The other potential effects associated with log transfer facilities are from log rafts and log storage in saltwater. The area under a log raft may be affected by bark accumulations with effects similar to but not as concentrated as those discussed for log transfer facilities. In addition, if the raft is stored in a bay or cove for a long period of time, marine algae may be affected by shading. Occasionally, rafts stored in shallow depths may ground on the bottom. This would cause mechanical disruption or compaction of inter- and subtidal bottom habitats. This would be a short-duration effect because recolonization would begin shortly after the raft refloated, unless the site were repeatedly used and log rafts frequently grounded. Proposed and existing log storage areas in the Project Area are deep enough and are not expected to ground.

Barge LTF's. Barge log transfer facilities probably would have less effect on the marine environment than rafting log transfer facilities, although no studies are available for comparison. The rock embankment associated with the facility would be longer and slightly wider at the seaward end. The additional length and width would eliminate a larger intertidal area than a rafting log transfer facility breakwater would do. The longer length and wider seaward end in deeper water would require dredging and filling in the subtidal area Bark and debris would accumulate only in a small area around the extreme seaward end of the facility.

LAND STATUS

Key Terms

Alaska Native Claims Settlement Act (ANCSA) - provides for the settlement of certain land claims of Alaska Natives
Encumbrance: a claim, lien, charge, or liability attached to and binding real property
Native Selection: application by Native corporations to the USDI Bureau of Land Management for conveyance of a portion of lands withdrawn under ANCSA in fulfillment of Native entitlements established under ANCSA
State Selection: application by Alaska Department of Natural Resources to the USDI Bureau of Land Management for conveyance of a portion of the 400,000-acre State entitlement from vacant and unappropriated National Forest System lands in Alaska, under the Alaska Statehood Act

Affected Environment

Land Ownership

Prior to 1971, the Tongass National Forest, Ketchikan Area land base was fairly stable, with only minor changes taking place as National Forest system lands were transferred to private homesites, canneries, and townsites. Beginning in the early 1970's, however, major land ownership changes were made as a result of major legislation, including the Alaska Native Claims Settlement Act (ANCSA) and the Alaska National Interests Land Conservation Act (ANILCA). Within the CPOW Project Area there are approximately 25,491 acres of State selections, Native selections, private ownership, and National Forest administrative sites. In addition there are some USDA Forest Service administrative sites (191 acres) and lands being used under special use permits (15 acres). No timber harvest for the CPOW project is being proposed on any of these lands. Figure 3-72 shows the breakdown of non-National Forest System lands within the CPOW Project Area.

State Selections

The State of Alaska, under the Statehood Act of 1959, is entitled to select up to 400,000 acres from the national forests in Alaska. To date 57 percent of the entitlement has been conveyed. Most of the remaining acres have been selected and are in the process of being conveyed by the Bureau of Land Management. These unconveyed selections within the CPOW Project Area are adjacent to Naukati (2,486 acres) and to Thorne Bay (4,933 acres). Because the State of Alaska was granted the opportunity to select more lands than will actually be conveyed, some of these lands may become available for National Forest harvest in the future.

Private Land

Approximately 12,813 acres are in other ownership. These lands include state and city ownership adjacent to communities, as well as private individual homesites. These lands are found in the Coffman Cove area (2,156 acres), Thorne Bay area (9,592 acres), Whale Pass area (850 acres), Sarkar village (4 acres), private individual homesites (122 acres), and a single mineral survey (89 acres).

Native Selections

Native selections are authorized under 14(h)(8) of ANCSA. The total of all Native selections, including both conveyed and unconveyed tracts, is 5;008 acres. This includes 110 acres where Native selections have been made within the CPOW Project Area but have not been conveyed. In addition, there are two Native allotments totaling 182 acres authorized by the Alaska Native Allotment Act of 1906, which provided that Native individuals who had occupied lands prior to the designation as National Forest could apply for conveyance of up to 160 acres. (The Alaska Native Claims Settlement Act repealed the Native Allotment Act, thereby eliminating future allotments.) Finally, there are 4,716 acres which have been withdrawn for selection by either a village or the regional corporation. They have not been selected but they are encumbered by the withdrawal. Timber harvest can take place, but the Native corporation must be notified and the receipts put into an escrow account. Because Native corporations were granted the opportunity to select more lands than will actually be conveyed, some of these lands may become available for National Forest harvest in the future.

Other Encumbrances

There are an additional 251 acres encumbered by withdrawals—for a U.S. Coast Guard lighthouse (245 acres) and for a homestead (6 acres). No timber is planned to be harvested within the withdrawal areas.

Special Use Permits

Several special use permits have been issued by the Forest Service for specific exclusive uses on National Forest system lands. These lands total 15 acres and include electronic sites, processing plants, construction camps, private residences, and transmission lines.

Administrative Sites

There are several Forest Service administrative sites, including Whale Pass (89 acres), Thorne Bay (50 acres), and the Thorne Bay sort yard (53 acres).

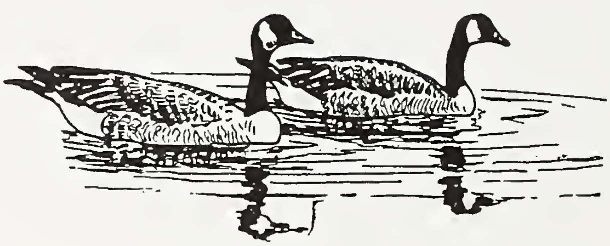
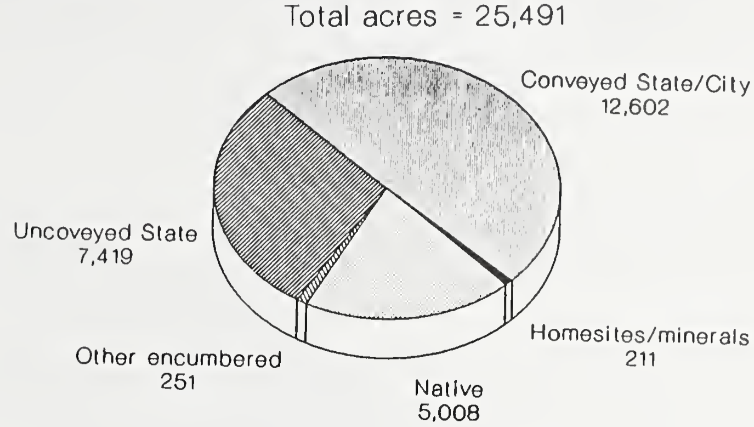


Figure 3-72
Summary of Non-National Forest Lands Within CPOW Project Area



Effects of the Alternatives

There are 16 harvest units proposed by the action alternatives that lie adjacent to non-National Forest system land. These units must have boundary lines established prior to implementation to ensure that harvest does not encroach on non-National Forest system ownership. Table 3-144 shows these units and the alternatives under which they are considered for harvest.

Table 3-144
Proposed Harvest Adjacent to Non-National Forest System Land, by Alternative

Unit	Alternative				
550-218	F2	F3	F4	F5	
571-267	F2	F3	F4	F5	
571-268	F2	F3	F4	F5	
572-211	F2	F3	F4	F5	
572-226	F2	F3	F4		F6
586-216	F2	F3	F4	F5	F6
586-217	F2	F3	F4	F5	F6
586-218	F2	F3	F4	F5	F6
586-218B	F2	F3	F4	F5	F6
586-220	F2	F3	F4	F5	F6
586-225		F3	F4	F5	F6
586-228	F2				F6
586-229	F2	F3	F4		F6
586-232	F2		F4	F5	F6
598-206		F3	F4		
598-218	F2	F3	F4	F5	F6

Rights of Way

Logging adjacent to non-National Forest system lands may require right-of-way agreements for establishing tailholds or suspending logging cables over non-National Forest system roads, or land use agreements for establishing tailholds or suspending logging cables over non-National Forest system lands. It will also be necessary to directionally fall timber away from non-National Forest system lands. These requirements will be analyzed and negotiated on a case-by-case basis, depending on site specific logging/transportation systems.

OTHER ENVIRONMENTAL CONSIDERATIONS

Irreversible Commitments

Irreversible commitments are decisions affecting non-renewable resources such as soils, wetlands, unroaded areas, and cultural resources. Such commitments are considered irreversible because the resource has deteriorated to the point that renewal can occur only over a long period of time or at a great expense, or because the resource has been destroyed or removed.

The construction of Arterial and Collector roads, to provide access to the Forest, is an irreversible action because of the long time it takes for a constructed road to revert to natural conditions. Also irreversible are the associated rock quarries which are developed in conjunction with these roads. Alternatives 1 and 1a have no new road construction while alternatives F2, F3, F4, F5 and F6 will construct 114, 146, 112, 105, and 107 miles of new specified or temporary roads.

There are five roadless areas as identified in the TLMP Draft Revision (1991a) that may be affected by the CPOW project. A decision to develop these roadless areas would mean that their primitive character in terms of opportunities for solitude, remoteness, and development of wilderness skills would irreversibly gone. Table 3-106 in the Recreation section of this chapter shows the overall size of these roadless areas and how many acres would be harvested in them by alternative. Alternatives 1 and 1a schedule no timber harvest in roadless areas; under the range of action alternatives (Alts.F2–F6), approximately 3,500 acres of currently roadless area would be irreversibly committed.

Old-growth habitat lost due to logging can be considered an irreversible effect since it is not expected to regain old-growth characteristics for at least 200 years. From seven to eight percent of acres in the Project Area would change under the range of action alternatives F2–F6. See Figure 3-3 in the Old Growth and Biodiversity section of this chapter.

Loss of soil due to erosion and mass failures is an irreversible commitment. However, because of the incorporation of Best Management Practices (BMP's), Forest Plan standards and guidelines, and mitigation measures specified in this document, it is not anticipated that there would be any significant soil loss under any alternative.

Loss of cultural resource sites resulting from accidental damage or vandalism would be an irreversible commitment of resources. Extensive cultural resource field surveys and deferral of harvest in all areas where significant cultural resources were found provide reasonable assurance that there would be no irreversible loss of cultural resources.

Loss of cave resources resulting from accidental damage or vandalism in the Project Area would also be an irreversible commitment of resources. Extensive field surveys and deferral of harvest or application of mitigation measures to all areas where cave resources were found provide reasonable assurance that there would be no irreversible loss of cave resources.

Irretrievable Commitments

Irretrievable commitment of natural resources means loss of production or use of resources due to management decisions made in the alternative. This represents opportunities foregone for the period of time that the resource cannot be used.

The reduction in the visual quality of an area due to timber harvesting will be an irretrievable commitment of resources. The commitment is irretrievable since viewsheds will typically heal from a visual quality standpoint after about 40 years. After this time the second-growth trees will have the color and height needed so as not to be evident to the casual observer. Alternatives 1 and 1a will have no irretrievable commitment of visual quality. Alternatives F2, F3, F4, F5, and F6 will irretrievably commit visual resources due to timber harvesting.

Short-term Uses and Long-Term Productivity

The use of natural resources for long-term sustained yield is at the basis of National Forest management and direction. The proposed timber harvesting under the Best Management Practices (BMP's), Tongass Land Management Plan standards and guidelines, Proposed Tongass Land Management Plan Revision standards and guidelines, and Regional Guide direction will result in no long-term loss in productivity on the Tongass National Forest as a whole.

Possible Conflicts with Plans and Policies of Other Jurisdictions

The regulations for implementing NEPA require a determination of possible conflicts between the proposed action and the objectives of Federal, State, and local land-use plans, policies, and controls for the area. The major land-use regulations of concern are the Coastal Zone Management Act (CZMA), Section 810 of ANILCA, and the State of Alaska's Forest Practices Act. A discussion of each of these determinations is presented below.

Coastal Zone Management Act of 1976 (CZMA)

The CZMA was passed by Congress in 1976 and amended in 1990. This law requires Federal agencies conducting activities or undertaking development affecting the coastal zone to ensure that the activities or developments are consistent with approved state coastal management programs to the maximum extent practicable. The State of Alaska passed the Alaska Coastal Management Act in 1977 to establish a program that meets the requirements of the CZMA. It contains the standards and criteria for a determination of consistency for activities within the coastal zone.

Forest Service requirements for consistency are detailed in a Memorandum of Understanding between the State of Alaska and the Regional Forester, dated October 8, 1981. Standards against which the consistency evaluation will take place are: Alaska Statute Title 46, Water, Air, Energy, and Environmental Conservation; and the Alaska Forest Practices Act of 1990.

The Forest Service has designed all alternatives to ensure that the activities and developments affecting the coastal zone are consistent with approved coastal management programs to the maximum extent practicable.

Alaska National Interest Lands Conservation Act of 1980 (ANILCA)

Under Section 810 of ANILCA, agencies are required to evaluate the effects of proposed actions on subsistence uses of Federal land and to determine if the proposed action may significantly restrict subsistence opportunities. Refer to the Subsistence

section of this chapter for the evaluation of impacts to subsistence use as a result of the alternatives.

State of Alaska's Forest Practices Act of 1990

On May 11, 1990, the governor approved the legislature's major revision of the state's Forest Practices Act (FPA). The revised act significantly increases the state's role in providing protection and management for important forest resources on state and private lands. The revised Forest Practices Act will also affect National Forest management through its relationship to the Alaska Coastal Management Program and the Federal CZMA discussed above.

For National Forest timber operations, such as proposed for CPOW, the effect of the revised Forest Practices Act is essentially two-fold. First, it clarifies that the revised Forest Practices Act is the standard which must be used for evaluating timber harvest activities on Federal lands for purposes of determining consistency to the maximum extent practicable with the Alaska Coastal Zone Management Program. Secondly, it calls for minimum 100-foot buffers on all Class I streams, and recognizes that consistency to the maximum extent possible for purposes of the Alaska Coastal Management Program is attainable in Federal timber harvest activities using specific methodologies which may differ from those required by the revised Forest Practices Act or its implementing regulations.

The TTRA prohibited commercial timber harvesting within buffer zones established on all Class I streams and those Class II streams which flow directly into a Class I stream. Buffer zones have a minimum width of 100-feet slope distance from the edge of either side of the stream. In addition, the Forest Service is currently working with the Alaska State Division of Governmental Coordination on a revision of the Memorandum of Understanding (MOU) between the state and the Forest Service. This revised MOU will establish the policies and procedures for coordinating state review of Forest Service programs and activities, including those covered by the Forest Practices Act and the Alaska Coastal Zone Management Program.

The Forest Service evaluated the alternatives prior to completion of the Final EIS and the ROD to ensure that the activities and developments specifically covered by the Forest Practices Act are consistent with its provisions to the maximum extent possible.

Energy Requirements and Conservation Potential of Alternatives

The implementation of the proposed alternatives in the CPOW Project Area will require the expenditure of energy (fuel consumption). The amount of energy used varies by alternative based on timber volume harvested and miles of road constructed or reconstructed. The direct effect of the alternatives on energy requirements would be attributed to timber harvest, road construction and reconstruction, and travel necessary to administer the timber sale. Indirect energy requirements include processing wood products and the transport of the products to secondary processors and consumers. The estimated total fuel consumption required for each alternative is displayed in Table 3-145.

Table 3-145
Estimated Fuel Consumption (Millions of Gallons) by Alternative

Activity	1	1a	F2	F3	F4	F5	F6
Prep. and Admin. (1.56 gall/MBF)	0	0	0.418	0.412	0.407	0.420	0.410
Logging and Transport. (14.8 gall/MBF)	0	0	3.966	3.907	3.863	3.981	3.892
Road Constr. and Maint. (4,000 gall/mile)	0	0	0.456	0.584	0.448	0.420	0.428
Total consumption	0	0	4.840	4.903	4.718	4.821	4.730

SOURCE: D.Arrasmith 1992.
Note: The estimated fuel consumption for timber harvest activities is based on consumption per MBF.

Implementation of CPOW action alternatives would require expenditure of energy in the form of fuel for trucks and other equipment.

Natural or Depletable Resource Requirements and Conservation Potential

All alternatives considered in detail are designed to conform to applicable laws and regulations pertaining to natural or depletable resources, including minerals and energy resources. Regulation of mineral and energy activities on the National Forest, under the U.S. Mining Laws Act of 1872 and the Mineral Leasing Act of 1920, is shared with the Bureau of Land Management (BLM). The demand for access to National Forest lands for the purpose of mineral and energy exploration and development is expected to increase over time.

The action alternatives propose road construction that will increase opportunities for access to the National Forest within the CPOW Project Area. This increased access may result in increased activity with regard to both known and potential mineral or energy resource occurrences. There are two known mineral prospects in the Project Area. These prospects indicate occurrences of copper and gold, but at this time there are no mining claims. The actual potential for increased mineral or energy resource activity in the Project Area is not known, nor can an accurate estimate be made.

Urban Quality, Historic and Cultural Resources

The CPOW Project Area contains no urban areas. Therefore, the only applicable concern under this topic is with historic and cultural resources. The goal of the Forest Service's Cultural Resource Management Program is to preserve significant cultural resources in their field setting and ensure they remain available in the future for research, social/cultural purposes, recreation, and education. The direct, indirect, and cumulative effects of the alternatives on cultural resources have been evaluated. The result of this evaluation is the determination that there are adequate standards, guidelines, and procedures to protect cultural resources and to meet the goals of the Cultural Resource Management Program. Cultural resources are discussed further in the Cultural Resources section of this chapter.

Consumers, Civil Rights, Minorities and Women

All Forest Service actions have the potential to produce some form of impact, positive and/or negative, on the civil rights of individuals or groups, including minorities and women. The need to conduct an analysis of this potential impact is required by Forest Service Manual and Forest Service Handbook direction. The purpose of the impact analysis is to determine the scope, intensity, duration, and direction of impacts resulting from a proposed action. For environmental or natural resource actions, such as proposed for CPOW, the civil rights impact analysis is an integral part of the procedures and variables associated with the social impact analysis. This analysis is discussed in the Socio-Economic section of this chapter.

The effect of the alternatives on consumers is reflected in the discussion of the various goods and services supplied as a result of the proposed actions. This analysis occurs throughout the chapter as an integral part of the analysis of the effects on other components of the environment.

Prime Farmland, Rangeland, and Forest Land

All alternatives are in keeping with the intent of Secretary of Agriculture Memorandum 1827 for prime land. The Project Area does not contain any prime farmlands or rangelands. Prime forest land does not apply to lands within the National Forest system. In all alternatives, lands administered by the Forest Service would be managed with a sensitivity to the effects on adjacent lands.

Threatened and Endangered Species, and Critical Habitat

There will be no adverse impacts to any Federally listed threatened or endangered species or critical habitat as a result of this project. No endangered or threatened wildlife species are known to occur in the Project Area, although Humpback whales and Steller sea lions are occasionally found in waters bordering the Project Area. The discussion of the effects of the alternatives on threatened, endangered, or sensitive species is presented in the Threatened and Endangered Species section of this chapter.

A Biological Assessment is found in Appendix B.

Chapter 4

Outline

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Agencies and Organizations Sent Summary of EIS

AK Board of Fisheries, Joe Demmert, Jr., Ketchikan
AK Board of Fisheries, Debra Lyons, Petersburg
AK Center for the Environment, Sue Libenson, Executive Dir.
AK Dept. of Commerce and Economic Development, Paul Fuhs, Dir.
AK Dept. of Environmental Conservation, Mike Menge, Director
AK Dept. of Environ. Conserv., Ira Winogard, Wetlands Coord.
AK Dept. of Environ. Conserv., John A. Sandor, Commissioner
AK Dept. of Fish and Game (ADF&G), Don Cornelius, Petersburg
ADF&G, Area Habitat Biologist, Petersburg
ADF&G, Don Kelly, Petersburg
ADF&G, Sport Fish Division, Glenn Freeman, Ketchikan
ADF&G, Carl L. Rosier, Commissioner
AK Dept. of Natural Resources, Harold Heinze, Commissioner
AK Environmental Lobby, Marna Schwartz, Executive Director
AK Office of the Governor, Land Use Council
AK Marine Highway, Werner Sund
AK Miners Assn., Ketchikan Branch, Ken Eichner
AK Native Brotherhood/Alaska Native Sisterhood, Sitka
AK Natural History Assn., Judith Foster, Anchorage
AK Sport Fishing Assn., Geoffrey Parker, Anchorage
AK Timberland Corp., Glenn Charles, Gen. Mgr., Craig
AK Wildlife Alliance, Valerie Brown, Exec. Dir., Anchorage
AK Women in Timber, Jackie Durette, Director
AK Woods Service Company, Eric Muench
Alaskan Star Charters, Ken Wyrick
Associated Press, Brian Akre, Juneau
B & D Lab, Dave and Bonna Wieler
Bureau of Indian Affairs, Metlakatla Field Office, H.C. Alameda, Sr.
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Clover Bay Lodge, Stanley and Bonnie Oaksmith
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Coffman Cove Civic Club, Judy Willis
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Craig, City of, Dennis Watson, Mayor
Daily Sitka Sentinel, Editor
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Edna Bay Advisory Committee, Michael Folson
Edna Bay Advisory Committee, Judy Slattery
Friends of the Earth, Mike Holloway, Anchorage
Garcon Enterprises, Garner Wear
Greater Ketchikan Chamber of Commerce, Nancy Watt
Greater Prince of Wales Chamber of Commerce, Doc Waterman
Haida Corporation, Bruce Cook, Jr., General Manager

Haida Corporation, Martin Alexander, Seattle
Harding's Custom Specialty Woods, Bruce Harding
Harza Northwest, Jeff Boyce
Hydaburg, City of, Administrator
Hydaburg, City of, Eugene Natkong, Mayor
Hydaburg Cooperative Association, Robert Sanderson, President
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KSTK, Matt Bertles, Wrangell
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Ketchikan Chamber of Commerce, Jan Mestas
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Ketchikan, City of, Alaire Stanton, Mayor
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Ketchikan Daily News, Belinda Chase
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Sitka Tribe of Alaska, Constance Simpson
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Southeast Conference, Jim Kohler, Executive Director
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Bruce Hill School, Port Alice

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Mariner, Inc., Len Laurance
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National Agricultural Library, Patricia K. Wheeler (3 c.)
National Marine Fisheries Service/NOAA, Steven Pennoyer, Dir.
National Outdoor Leadership School, P. Twardock, Anchorage
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Wrangell Resource Council, Alice Hanson
Wrangell Sentinel, Lew Bresee, Editor
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Glossary

Abiotic
Non-living.

Access
The opportunity to approach, enter, and make use of public lands.

Access Management
Aquiring rights and developing and maintaining facilities needed by people to get to and move through public lands.

Adfluvial Fish
Fish that do not go to sea, but live in lakes and enter streams to spawn.

Aelvin
Young salmon that are still attached to the yolk sac, which provides nourishment.

AHMU
See Aquatic Habitat Management Unit.

Aerial Harvest Systems
See Logging Systems.

Alaska National Interest Lands Conservation Act (ANILCA)
Passed by Congress in 1980, this legislation designated 14 National Forest wilderness areas in Southeast Alaska. Section 810 requires evaluations of subsistence impacts before changing the use of these lands.

Alaska Native Claims Settlement Act (ANCSA)
Public Law 92-203, 92nd Congress, 85 Stat. 2371-2551. Approved December 18, 1971, ANCSA provides for the settlement of certain land claims of Native Alaskans and for other purposes.

Allowable Sale Quantity (ASQ)
The maximum quantity of timber that may be sold each decade from a National Forest. This quantity, expressed in board feet, is calculated for the Tongass National Forest using timber utilization standards specified in the Alaska Regional Guide, the number and type of acres available for timber management, and the intensity of timber management. The ASQ was calculated at 4.5 billion board feet per decade for the Tongass National Forest.

Alternative
One of several policies, plans, or projects proposed for decision making.

Alluvium
A deposit of sand or mud formed by moving water.

Alluvial Fan
A fan-shaped deposit of sand, gravel, and fine material made by a stream where it runs out onto a level plain or meets a slower stream.

Amenity
Resource use, object, feature, quality, or experience that gives pleasure or is pleasing to the mind or senses. Amenity values typically are those for which monetary values are not or cannot be established. See also, commodity.

Anadromous Fish
Fish that spend part of their lives in freshwater and part of their lives in saltwater (such as salmon, steelhead, and sea-run cutthroat trout).

Analysis Area
A planning unit made up of two or more management areas identified in the Tongass Land Management Plan.

Appraisal
See Timber Appraisal.

Aquatic Habitat Management Unit (AHMU)
A mapping unit that displays an identified value for aquatic resources. It is a mechanism for carrying out aquatic resource management policy.
Class I AHMU: Streams with anadromous or adfluvial fish habitat. Also included is the habitat upstream from migration barriers known to have reasonable enhancement opportunities for anadromous fish and habitat with high value resident sport fish populations.
Class II AHMU: Streams with resident fish populations and generally steep (6 to 15 percent) gradient (can also include streams from 0 to 6 percent gradient where no anadromous fish occur). These populations have limited sport fisheries values and are separate from the high-quality sport fishing systems included in Class I. They generally occur upstream of migration barriers or are steep gradient streams with other habitat features that preclude anadromous fish use.
Class III AHMU: Streams that have no fish populations but that have potential water quality influence on the downstream aquatic habitat.

Background
The distant part of a landscape. The seen, or viewed area located from three or five miles to infinity from the viewer. See also, Foreground and Middleground.

Beach Fringe Habitat
Non-forested habitat that occurs from the intertidal zone inland 500 feet, and islands of less than 50 acres; forested habitat that occurs from the intertidal zone inland 600 feet, and islands less than 50 acres in size.

Bedload
Sand, silt, and gravel, or soil and rock debris rolled along the bottom of a stream by the moving water.

Benthic
Refers to the substrate amd organisms in and on the bottom of a body of water.

Best Management Practices (BMP)
Practices used for the protection of water quality. BMP's are designed to prevent or reduce the amount of pollution from nonpoint sources or other adverse water quality impacts while meeting other goals and objectives. BMP's are standards to be achieved, not detailed or site specific prescriptions or solutions. BMP's as defined in the USDA Forest Service Soil & Water Conservation Handbook are mandated for use in Region 10 under the Tongass Timber Reform Act.

Biological Diversity (Biodiversity)
The variety of life in all its forms and at all scales. This includes the various kinds and combinations of: genes; species of plants, animals, and microorganisms; populations; communities; and ecosystems. It also includes the physical and ecological processes that allow all species to interact and survive. The most familiar scale of biological diversity is species diversity, which is the number and abundance of plants, animals, and microorganisms.

Biotic
Refers to life, living. See also, abiotic.

Board Foot (BF)
A unit of wood 12" X 12" X 1". One acre of commercial timber in Southeast Alaska on the average yields 28,000-34,000 board feet per acre (ranging from 8,000-90,000 board feet per acre). One million board feet (MMBF) would be the volume of wood covering one acre two feet thick. One million board feet yields approximately enough timber to build 120 houses or 75,555 pounds of dissolving pulp.

Bog
An undrained or imperfectly drained area with a vegetation complex composed of sedges, shrubs, and sphagnum mosses, typically with peat formation. See also, muskeg.

Bole
Trunk of the tree.

Broadcast Burning
Burning of an area that has been clearcut to remove logging slash from the site. Broadcast burning is done to prepare sites for regeneration or improve wildlife habitat.

Brush Disposal
Cleanup and disposal of slash and other hazardous fuels within the forest or project areas.

Buffer
The Tongass Timber Reform Act (TTRA) requires that timber harvest be prohibited in an area no less than 100 feet on each side of all Class I streams and Class II streams which flow directly into Class I streams. This 100-foot area is known as a buffer.

Canopy
See overstory.

Cant
A log partly or wholly cut and destined for further processing.

Capability
An evaluation of a resource's inherent potential for use.

Carrying Capacity
The maximum number of a species that can be supported indefinitely by available resources in a given area.

Cave
Any naturally ocurring void, cavity, recess, or system of interconnected passages which occurs beneath the surface of the earth or within a cliff or ledge and which is large enough to permit an individual to enter.

Cave Resources
Any material or substance occurring in caves on Federal lands, such as animal life, plant life, paleontological resources, cultural resources, sediments, minerals, speleogens, and speleothems.

Channel Types
The defining of stream sections based on watershed runoff, landform relief, and geology.

Class I, II, III Streams
See Aquatic Habitat Management Units.

Clearcut
The harvesting in one cut of all trees on an area. The area harvested may be a patch, strip, or stand large enough to be mapped or recorded as a separate class in planning for sustained yield. Clearcut size on the Tongass National Forest is limited to 100 acres, except for specific conditions noted in the Alaska Regional Guide.

Climax
A community of plants and animals which is relatively stable over time and which represents the late stages of succession under the current climate and soil conditions.

Code of Federal Regulations (CFR)
A codification of the general and permanent rules published in the Federal Register by the executive departments and agencies of the Federal Government.

Commercial Forest Land (CFL)
Productive forest land that is producing or capable of producing continuous crops of industrial wood and is not withdrawn from timber utilization by statute or administrative regulation. This includes areas suitable for management and generally capable of producing in excess of 20 cubic feet per acre of annual growth or in excess of 8,000 board feet net volume per acre. It includes accessible and inaccessible areas.

Commercial Thinning
Thinning a stand where the trees to be removed are large enough to sell.

Commodity
Resources with monetary (market) or commercial value; all resource products which are articles of commerce, e.g., timber and minerals. See also, amenity.

Corridor (Biological)
Defined tracts of land, usually linear, that connect patches of similar habitat. Biological corridors provide avenues along which wide-ranging animals can travel, plants can propagate, genetic interchange can occur, populations can move in response to environmental changes and natural disasters, and threatened species can be replenished from other areas. ("Corridor" may also refer to roads, trails, and utility rights of way.)

Cover
Refers to trees, shrubs, or other landscape features that allow an animal to partly or fully conceal itself.

Cruise
Refers to the general activity of determining timber volumes and quality, as opposed to a specific method.

Cultural Resources
Historic or prehistoric objects, sites, buildings, structures, and their remains, resulting from past human activities.

Cumulative Effects
The impacts on the environment resulting from the addition of the incremental impacts of past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such actions. Cumulative impacts can result from individually minor but collectively significant actions occurring over time.

Current Timber Supply
Timber specified by the Forest Service that has not been rejected by the purchaser and that has undergone analysis under the National Environmental Policy Act (NEPA).

Cutover
Areas harvested recently.

DBH
Diameter at Breast Height. The diameter of a tree measured 4 feet 6 inches from the ground.

Debris avalanche
The sudden movement downslope of the soil mantle; it occurs on steep slopes and is caused by the complete saturation of the soil from prolonged heavy rains.

Debris flow
A general term for all types of rapid movement of debris downslope.

Debris torrents
Landslides that occur as a result of debris; avalanche materials which either dam a channel temporarily or accumulate behind temporary obstructions such as logs and forest debris.

Deer Winter Range
Locations that provide food and shelter for Sitka Black-tail deer under moderately severe to severe winter conditions.

Developed Recreation
Recreation that requires facilities that, in turn, result in concentrated use of an area, such as campgrounds and ski areas. Facilities in these areas might include roads, parking lots, picnic tables, toilets, drinking water, ski lifts, and buildings. See also, dispersed recreation.

Direct Employment
The jobs that are immediately associated with the Long-Term Contract Timber Sale, including, for example, logging, sawmills, and pulpmills.

Discounted Benefits
The sum of all benefits derived from the forest over the life of a project.

Discounted Costs
The sum of all costs incurred from a project area during its period of implementation.

Dispersed Recreation
Recreational activities that are not confined to a specific place and are generally outside developed recreation sites. This includes activities such as scenic driving, hiking, backpacking, hunting, fishing, snowmobiling, horseback riding, cross-country skiing, and recreation in primitive environments. See also, developed recreation.

Doline
A relatively shallow, bowl- or funnel-shaped depression ranging in diameter from a few to more than 3,000 feet. Also known as a sinkhole.

Down
A tree or portion of a tree which is dead and laying on the ground.

Draft Environmental Impact Statement (DEIS, or Draft EIS)
A statement of environmental effects for a major Federal action which is released to the public and other agencies for comment and review prior to a final EIS and management decision. Required by Section 102 of the National Environmental Policy Act (NEPA).

Duff
Vegetative material covering the mineral soils in forests, including the fresh litter and well decomposed organic material and humus.

Eagle Nest Tree Buffer Zone
A 330-foot radius around eagle nest trees established in a Memorandum of Understanding between the U.S. Fish and Wildlife Service and the Forest Service.

Effects
Effects, impacts, and consequences as used in this environmental impact statement are synonymous. Effects may be ecological (such as the effects on natural resources and on the components, structures, and functioning of affected ecosystems), aesthetic, historical, cultural, economic, or social, and may be direct, indirect, or cumulative.
Direct Effects
Results of an action occurring when and where the action takes place.

Indirect Effects
Results of an action occurring at a location other than where the action takes place and/or later in time, but in the reasonably foreseeable future.
Cumulative Effects
See Cumulative Effects.

Encumbrance
A claim, lien, charge, or liability attached to and binding real property.

Endangered Species
Any species of animal or plant that is in danger of extinction throughout all or a significant portion of its range. Plant or animal species identified by the Secretary of the Interior as endangered in accordance with the 1973 Endangered Species Act. See also, threatened species, sensitive species.

Endemic
Peculiar to a particular locality; indigenous.

Environmental Analysis
A comprehensive evaluation of alternative actions and their predictable short-term and long-term environmental effects, which include physical, biological, economic, social, and environmental design factors and their interactions. An EA is less comprehensive than an Environmental Impact Statement (EIS), and may result in a Finding of No Significant Impact; should the EA reveal significant impacts, a full EIS must then be conducted.

Erosion
The wearing away of the land surface by running water, wind, ice, gravity or other geological activities.

Escapement
Adult anadromous fish that escape from all causes of mortality (human-caused or natural) to return to streams to spawn.

Estuarine Fringe Habitat
A 1,000-foot timbered zone around an estuary.

Estuary
For the purpose of this EIS process, estuary refers to the relatively flat, intertidal, and upland areas generally found at the heads of bays and mouths of streams. They are predominately mud and grass flats and are unforested except for scattered spruce or cottonwood.

Even-aged Management
Management that results in the creation of stands in which trees of essentially the same age grow together. Clearcut, shelterwood, and other tree cutting methods produce even-aged stands. See also, uneven-aged management.

Executive Order
An order or regulation issued by the President or some administrative authority under his or her direction.

Existing Visual Condition (EVC)
The level of visual quality or condition presently occurring on the ground. The six existing visual condition categories are:
Type I: These areas appear to be untouched by human activities.
Type II: Areas in which changes in the landscape are not visually evident. The natural appearance of the landscape still remains dominant.
Type III: Areas in which changes in the landscape are easily noticed and may attract some attention. The change in landscape is noticeable, but it may resemble a natural disturbance.
Type IV: Changes in the landscape are easily noticed and perceived as disturbances, but resemble natural patterns.
Type V: Areas in which changes in the landscape are dominant and obvious. These changes appear to be major disturbances.
Type VI: Areas in which changes in the landscape are in glaring contrast to the natural landscape. The changes appear to be a drastic disturbance.

Fen
A tract of low, marshy ground consisting of organic terrain, relatively rich in mineral salts. See also, muskeg.

Final Environmental Impact Statement (FEIS, or Final EIS)
The final version of the statement of environmental effects required for major federal actions under Section 102 of the National Environmental Policy Act. It is a revision of the Draft EIS to include public and agency responses to the draft. The decision maker chooses which alternative to select from the Final EIS, and subsequently issues a Record of Decision (ROD).

Fines
Minute particles of soil.

Fiscal Year
October 1 through September 30; e.g., Oct. 1, 1991 - Sept. 30, 1992 = FY92.

Fish Timing
A mitigation measure that restricts construction activities within an anadromous fish stream, to minimize impacts on fish eggs, fry, and migrating salmonids. The normal period allowing construction activities in fish streams in this area is May 15 to August 20.

Floodplain
That portion of a river valley, adjacent to the river channel, which is covered with water when the river overflows its banks at flood stages.

Fluvial
Of or pertaining to streams and rivers.

Forage
To wander or go in search of food.

Forbs
Herbaceous plants that are not grasses or grass-like. Includes plants that are commonly called weeds or wildflowers.

Foreground
The stand of trees immediately adjacent to a scenic area, recreation facility, or forest highway; area located less than 1/4 mile from the viewer. See also, Background and Middleground.

Forest or Forest Land
National Forest lands currently supporting or capable of supporting forests at a density of 10 percent crown closure or better. Includes all areas with forest cover, including old growth and second growth, and both commercial and non-commercial forest land.

Forest and Rangeland Renewable Resources Planning Act of 1976 (RPA)
Provides national direction for the management of national forests and grasslands. Amended in 1976 by the National Forest Management Act.

Forest Supervisor
The Forest Service officer responsible for administering a single national forest. The office of the Forest Supervisor for the Ketchikan Area of the Tongass National Forest is located in Ketchikan, Alaska.

Geographic Information System (GIS)
An information processing technology to input, store, manipulate, analyze, and display spatial and attribute data to support the decision-making process. It is a system of computer maps with corresponding site specific information that can be electronically combined to provide reports and maps.

Glide Channel
Channel types that occur on lowlands and landforms, and are mostly associated with bogs, marshes, or lakes.

Grabinski
A modified highlead cable logging system.

Groundwater
Water within the earth that supplies wells and springs.

Guideline
A preferred or advisable course of action or level of attainment designed to promote achievement of goals and objectives.

Habitat
A place that provides seasonal or year-round food, water, shelter, and other environmental conditions for an organism, population, or community of plants or animals.

Habitat Capability
The number of healthy animals that a habitat can sustain. Used in wildlife models to calculate rough population estimates for Management Indicator Species.

Habitat Conservation Areas (HCA)
Contiguous blocks of habitat to be managed and conserved for breeding pairs, connectivity, and distribution of species of concern

Haulout
An area of large, smooth rocks used by seals and sea lions for resting and pupping.

Humus
Substance of organic origin that is fairly but not entirely resistant to further bacterial decay.

IMPLAN
A computer-based system used by the Forest Service for constructing nonsurvey models to measure economic input. The system includes a data base for all counties in the United States and a set of computer programs to retrieve data and perform the computational tasks for input/output analysis.

Inclusions
Soil types that are not delineated on soil resource inventory maps because they are too small (in area) to be mapped at the scale used in the inventory at any locale.

Indicator species
See Management Indicator Species.

Indirect Employment
The jobs in service industries that are associated with the Long-Term Timber Sale Contract, including, for example, suppliers of logging and milling equipment. See also, direct employment.

Inoperable Timber
Timber that cannot be harvested by any proven method because of potential resource damage, extremely adverse economic considerations, or physical limitations.

Interdisciplinary Team (IDT)
A group of people with different backgrounds assembled to research, analyze, and write a project Environmental Impact Statement in an interdisciplinary fashion. The team is assembled out of recognition that no one scientific discipline is sufficiently broad enough to adequately analyze a proposed action and its alternatives.

Irretrievable Commitments
Losses of production or use of renewable natural resources for a period of time. For example, timber production from an area is irretrievably lost during the time an area is allocated to a no-harvest prescription; if the allocation is changed to allow timber harvest, timber production can be resumed. The production lost is irretrievable, but not irreversible.

Irreversible Commitments
Decisions causing changes that cannot be reversed. For example, if a roadless area is allocated to allow timber harvest, and timber is actually harvested, that area cannot at a later time be allocated to wilderness; once harvested, the ability of the area to meet wilderness criteria has been irreversibly lost. Often applies to nonrenewable resources such as minerals and cultural resources.

Issue
A point, matter, or section of public discussion or interest to be addressed or decided.

Karst
A type of typography that develops in areas underlain by soluble rocks, primarily limestones. Areas on which karst has developed is said to display "karst topography" or is referred to as a "karst landscape." Caves are commonly found in karst areas.

Knutsen-Vandenburg Fund (KV)
The portion of timber sale receipts collected and used for reforestation and other renewable resource projects on the sale area.

Land Use Designation (LUD)
The method of classifying land uses presented in the 1979 Tongass Land Management Plan (TLMP). Land uses and activities are grouped to define, along with a set of coordinating policies, a compatible combination of management activities. These LUD's have been replaced in the TLMP Draft Revision by Management Prescriptions. The following is a description of the four LUD classifications:
LUD I: Wilderness areas. Undeveloped areas managed for solitude and primitive types of recreation, and containing unaltered habitats for plant and animal species.
LUD II: Lands to be managed in a roadless state in order to retain their wildland character; permits wildlife and fish habitat improvement as well as primitive recreation facilities and road development under special authorization.
LUD III: Lands to be managed for a variety of uses. The emphasis is on managing for uses and activities in a compatible and complimentary manner to provide the greatest combination of benefits.
LUD IV: Lands that provide opportunities for intensive resource use and development, where the emphasis is primarily on commodity or market resources.

Large Woody Debris (LWD)
Any large piece of relatively stable woody material having a diameter of at least 10 centimeters and a length greater than one meter that intrudes into the stream channel. Also called Large Organic Debris (LOD).

Layout
Planning and mapping (using aerial photos) of harvest and road systems needed for total harvest of a given area.

Limiting Factor
The environmental factor–such as water, light, nutrients, or temperature–which acts as the immediate restriction to one or more of an organism's functions or activities or in its geographic distribution. The first environmental limit of tolerance that an organism reaches is the limiting factor.

Log Transfer Facility (LTF)
A facility that is used for transferring commercially harvested logs to and from a vessel or log raft, or the formation of a log raft. It is wholly or partially constructed in waters of the United States; siting and construction are regulated by the 1987 Amendments to the Clean Water Act. Formerly termed "terminal transfer facility."

Logging Systems
Highlead. A cable yarding system, using a two-drum yarder, in which lead blocks are hung on a spar or tower to provide lift to the front end of the logs.

Aerial Logging Systems. Systems where the cut logs are moved from the stump to the loading area or log deck without touching the ground.
Live skyline/gravity carriage return. A two-drum, live skyline yarding system in which the carriage moves down the skyline by gravity; the skyline is lowered to attach logs then raised and pulled to the landing by the mainline; thus, is restricted to uphill yarding.
Live skyline/haulback required. A live skyline yarding system composed of skyline, mainline, and haulback; the carriage is pulled to the woods by the haulback; the skyline is lowered to permit the chokers to be attached to the carriage, and the turn is brought to the landing by the mainline.
Running skyline. A yarding system with three suspended moving lines, generally referred to as the main, haulback, and slack-pulling, which when properly tensioned will provide lift, travel and control to the carriage; normally indicates a gantry type tower and a three-drum yarder.
Standing skyline. Used wherever yarding distances or span distances exceed the capability of live skyline equipment.
Multispan skyline. European equipment is commonly associated with this.
Tractor. Used to describe the full range of surface skidding equipment, designed to operate on level to downhill settings.
Shovel. A system of short-distance logging in which logs are moved from the stump to the landing by repeated swinging with a swing-boom log loader; the loader is walked off the haul road and out into the harvest unit; logs are moved and decked progressively closer to the haul road with each pass of the loader; when logs are finally decked at roadside, the same loader, or a different loader, loads out trucks. On gentle ground, logs are either heeled and swung or dragged by the boom as it rotates; larger log length and tree length logs are usually dragged to maintain machine stability. Soils should be moderate to well drained and side slopes must be less than 20 percent; passes or stripes should be kept to a maximum of four.
Helicopter. Flight path cannot exceed 40 percent downhill or 30 percent uphill; landings must be selected so there is adequate room for the operation and so that the helicopter can make an upwind approach to the drop zone.
A-Frame. Beach fringe timber which is logged with a float mounted yarder typically rigged in a highlead configuration for direct A-frame yarding.
Cold-deck and swing. Planned to access areas not suitable for skyline operations.

Long-Term Contract
In this document, refers to the Ketchikan Pulp Company Long-Term Timber Sale Contract with the Forest Service.

MBF
A thousand board feet.

MMBF
A million board feet.

Management Area
An area one or more VCU's in size for which management direction was written in the Tongass Land Management Plan.

Management Indicator Species (MIS)
Species of vertebrates and invertebrates whose population changes are believed to best indicate the effects of land management activities. The following categories were used where appropriate: endangered and threatened plant and animal species identified on State and Federal lists; species with special habitat needs that may be influenced

significantly by planned management programs; species commonly hunted, fished, or trapped; non-game species of special interest; additional plant or animal selected because their population changes are believed to indicate effects of management activities on other species of a major biological community or on water quality.

Management Prescriptions
Method of classifying land uses presented in the Tongass Land Management Plan (TLMP) Revision Draft EIS. Replaces the Land Use Designations (LUD's) originally presented in TLMP.

Marginal
Commercial forest land (CFL) areas that do not qualify as standard or special CFL since they are not operable under short-term (ten years or less) projections of accessiblity and economic conditions.

Mass Failure
The downslope movement of a block or mass of soil. This usually occurs under conditions of high-soil moisture and does not include individual soil particles displaced as surface erosion.

Mass Wasting
A general term for a variety of processes by which large masses of earth material are moved by gravity either slowly or quickly from one place to another. Also known as mass movement.

McGilvery
Soil type which represents the only well drained organic soil found in the Ketchikan Area. It is composed of a thin layer (less than eight inches deep) of organic duff overlying bedrock or boulders, generally occupying the upper backslopes of hills and mountains. These soils are associated with cliffs and rock outcrops, and are sensitive to disturbance.

Middleground
The visible terrain beyond the foreground where individual trees are still visible but do not stand out distinctly from the landscape; area located 1/4 to 5 miles from the viewer. See also, Foreground and Background.

Mid-Market Analysis
An economic estimate of timber value at a point in time when half of the timber was harvested at a higher value and half was harvested at a lower value.

Mineral Soils
Soils consisting predominantly of, and having their properties determined by, mineral matter.

Mitigation
Measures designed to counteract environmental impacts or to make impacts less severe. These may include: avoiding an impact by not taking a certain action or part of an action; minimizing an impact by limiting the degree or magnitude of an action and its implementation; rectifying the impact by repairing, rehabilitating, or restoring the affected environment; reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action; or compensating for the impact by replacing or providing substitute resources or environments.

Model
A representation of reality used to describe, analyze, or understand a particular concept. A model may be a relatively simple qualitative description of a system or organization, or a highly abstract set of mathematical equations. A model has limits to its effectiveness, and is used as one of several tools to analyze a problem.

Monitoring
A process of collecting information to evaluate whether or not objectives of a project and its mitigation plan are being realized. Monitoring can occur at different levels: to confirm whether mitigation measures were carried out in the manner called for, to determine whether the mitigation measures were effective, or to validate whether overall goals and objectives were appropriate. Different levels call for different methods of monitoring.

Multi-Entry Layout Plan (MELP)
Interdisciplinary design and mapping of all potential timber harvest units, including associated logging and transportation systems, within a project area.

Muskeg
In Southeast Alaska, a type of bog or fen that has developed over thousands of years in depressions or flat areas on gentle to steep slopes. Also called peatlands.

Mychorrizae
The unique relationship between certain fungi and the roots of certain plants, particularly trees; important for plants to take nutrients from soil.

Natal stream
Home stream, where an anadromous fish is hatched.

National Environmental Policy Act (NEPA) of 1969
An Act to declare a national policy which will encourage productive and enjoyable harmony between humankind and the environment, to promote efforts which will prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of humanity, to enrich the understanding of the ecological systems and natural resources important to the nation, and to establish a Council on Environmental Quality.

National Forest Management Act (NFMA)
A law passed in 1976 as an amendment to the Forest and Rangeland Renewable Resources Planning Act requiring the preparation of Regional Guides and Forest Plans and the preparation of regulations to guide that development.

Native Allotment
A tract of non-mineral land, not to exceed 160 acres, on which a Native Alaskan (who was 21 years of age or head of a household) established continuous use and occupancy prior to the creation of the National Forests (authorized under the Native Allotment Act of May 17, 1906).

Native Selection
Application by Native corporations and individuals to a portion of the USDI Bureau of Land Management for conveyance of lands withdrawn in fullfillment of Native entitlements established under ANCSA.

No-action Alternative
The most likely condition expected to exist in the future if current management direction were to continue unchanged.

Non-commercial Forest Land
Land with more than 10 percent cover of commercial tree species but not qualifying as Commercial Forest Land.

Notice of Intent (NOI)
A notice printed in the Federal Register announcing that an Environmental Impact Statement will be prepared. The NOI must describe the proposed action and possible alternatives, describe the agency's proposed scoping process, and provide a contact person for further information.

Offering
A Forest Service specification of timber harvest units, subdivisions, roads, and other facilities and operations to meet the requirements of a contract.

Offering Area
A geographic area identified by the Forest Service within which the offering specifications are outlined. One or more offering areas may be identified within all or a portion of a project area.

Old-growth Forest
A forest stand characterized by trees usually well past the age of maturity, with declining growth rates, dead and dying trees, snags, and downed woody material. The stand usually includes large diameter trees, multi-layered canopies, a range of tree diameter sizes, and the notable presence of understory vegetation. Old-growth forests provide important habitat for Sitka black-tailed deer, martens, black bears, cavity nesting birds, raptors, and other wildlife species.

Organic Soils
Soils that contain a high percentage (greater than 15%) of organic matter throughout the soil depth.

Overmature
The stage at which a tree declines in vigor and soundness, for example, past the period of rapid height growth.

Overstory
The portion of trees in a forest which forms the uppermost layer of foliage. In a stand with several vegetative layers, the overstory is the uppermost layer usually formed by the tallest trees. Also called the canopy. See also, understory.

Parent Material
The unconsolidated and partly weathered rock fragments (or the C Horizon) from which upper layers of soil were derived.

Partial Cut
Method of harvesting trees where any number of live stems are left standing in any of various spatial patterns. Not clearcutting. Can include seed tree, shelterwood, or other methods.

Peak Flow
The highest discharge of water recorded over a specified period of time at a given stream location.

Pedogenic
The origin, character and utilization of soils.

pH
The degree of soil acidity or alkalinity.

Phloem
The tissue in plants that conducts foods such as sugar.

Planning Record
A detailed, formal account of the planning process for an EIS. The record contains data, maps, reports, planning process information, and results of public participation in the planning process. The planning record documents the decisions and activities that resulted in the Final EIS. Planning records are available for public review upon request under the Freedom of Information Act.

Pond Values
The delivered price of logs at the mill minus the cost to manufacture them into useable products.

Present Net Value
The difference between benefits and costs associated with the alternatives.

Precommercial Thinning
Removing trees that are too small to make a merchantable product to improve tree spacing and promote more rapid growth. See also, commercial thinning.

Receipts
Those priced benefits for which money will actually be paid to the Forest Service: recreation fees, timber harvest, mineral leases, and special use fees.

Record of Decision (ROD)
A document separate from but associated with an Environmental Impact Statement which states the decision, identifies all alternatives, specifying which were environmentally preferable, and states whether all practicable means to avoid environmental harm from the alternative have been adopted, and if not, why not.

Recreation Opportunity Spectrum (ROS)
Land delineations that identify a variety of recreation experience opportunities categorized into eight classes on a continuum from primitive to urban. Each class is defined in terms of the degree to which it satisfies certain recreation experience needs based on the extent to which the natural environment has been modified, the type of facilities provided, the degree of outdoor skills needed to enjoy the area, and the relative density of recreation use. Categories include: Primitive I, Primitive II, Semi-primitive Nonmotorized, Semi-primitive Motorized, Roaded Natural, Roaded Modified, Rural, and Urban.

Reforestation
The natural or artificial restocking of an area with trees.

Regeneration
The process of establishing a new crop of trees on previously harvested land.

Region
An area covered by a Forest Service regional guide. A region is generally composed of one or more national forests. Forest Service Region 10 includes the Tongass National Forest and the Chugach National Forest.

Regional Forester
The Forest Service official responsible for administering a single region.

Regional Guide
The guide developed to meet the requirements of the Forest and Rangeland Renewable Resources Planning Act of 1974 as amended. It guides all natural resource management activities and establishes management standards and guidelines for the National Forest System lands within a given region.

Research Natural Area (RNA)
An area set aside by a public or private agency specifically to preserve a representative sample of an ecological community primarily for scientific and educational purposes. In USDA Forest Service usage, research natural areas are areas designated to ensure representative samples of as many of the major naturally occurring plant communities as possible.

Reserved
Lands that have been withdrawn from the timber base by an Act of Congress, the Secretary of Agriculture, or the Chief of the Forest Service.

Resident Fish
Fish that are not anadromous and that reside in fresh water on a permanent basis. Resident fish include non-anadromous dolly varden char and cutthroat trout.

Riparian Area
Geographically delineable area with distinctive resource values and characteristics that contain elements of aquatic and riparian ecosystems.

Riparian Ecosystem
Transition zone between a stream or lake system and the adjacent land. Identified in part by soil characteristics or distinctive plant communities that require free or unbound water.

Roads
Arterial. Roads usually developed and operated for long-term land and resource management purposes to constant service.
Collector. Collects traffic from Forest local roads; usually connects to a Forest arterial or public highway.
Local. Provides access for a specific resource use activity such as a timber sale or recreational site, although other minor uses may be served.
Preplanned. Roads planned in a prior EIS.
Temporary. For National Forest timber sales, temporary roads are constructed to harvest timber on a one-time basis. These logging raods are not considered part of the permanent Forest transportation network and have stream crossing structures removed, erosion measures put into place, and the road closed to vehicular traffic after harvest is completed.

Roadless Area
An area of undeveloped public land identified in the roadless area inventory of the TLMP Draft Revision within which there are no improved roads maintained for travel by means of motorized vehicles intended for highway use.

Rotation
The planned number of years (approximately 100 years in Alaska) between the time that a Forest stand is regenerated and its next cutting at a specified stage of maturity.

Salmonid
Refers to the group of fishes to which salmon belong.

Salvage Sale
A timber sale to use dead and downed timber and scattered poor-risk trees that would not be marketable if left in the stand until the next scheduled harvest. Commonly used to "salvage" stands of trees damaged by fire or insects, or blown down by wind.

Sawlog
That portion of a tree that is suitable in size and quality for the production of dimension lumber, collectively known as sawtimber.

Scheduled Timber Harvests
Timber harvests done as part of meeting the allowable sale quantity.

Scoping Process
Early and open activities used to determine the scope and significance of a proposed action, what level of analysis is required, what data is needed, and what level of public participation is appropriate. Scoping focuses on the issues surrounding the proposed action, and the range of actions, alternatives, and impacts to be considered in an EA or an EIS.

Second Growth
Forest growth that has become established following some disturbance such as cutting, serious fire, or insect attack; even-aged stands that will grow back on a site after removal of the previous timber stand.

Sediment
Solid materials, both mineral and organic, in suspension or transported by water, gravity, ice, or air. May be moved and deposited away from their original location.

Selection Cutting
The annual or periodic removal or trees (particularly mature trees), individually or in small groups, from an uneven-aged Forest to realize the yield and establish a new crop of irregular constitution.

Sensitivity Level
The measure of people's concern for the scenic quality of national forests. In 1980, the Tongass National Forest assigned sensitivity levels to land areas viewed from boat routes, anchorages, plane routes, roads, trails, public-use areas, and recreation cabins.
Level I: Includes all seen areas from primary travel routes, use areas, and water bodies where at least three-fourths of the Forest visitors have a major concern for scenic quality.

Level II: Includes all seen areas from primary travel routes, use areas, and water bodies where at least one-fourth of the Forest visitors have a major concern for scenic quality.
Level III: Includes all seen areas from secondary travel routes, use areas, and water bodies where less than one-fourth of the Forest visitors have a major concern for scenic quality.

Sensitive Species
Plant and animal species which are susceptible or vulnerable to activity impacts or habitat alterations. Those species that have appeared in the Federal Register as proposed for classification or are under consideration for official listing as endangered or threatened species, that are on a non-official State list, or that are recognized by the regional forester as needing special management on National Forest lands to prevent placement on Federal or state lists.

Seral
Early stage of succession.

Shelterwood Cutting
A harvest method in which most of the trees are removed in an initial entry and some trees are left to naturally reseed the area and provide protection to new seedlings that establish on the site. A second entry is conducted later to remove the remaining trees.

Significant
Specific legal term under the National Environmental Policy Act, which requires considerations of both context and intensity in evaluating impacts.

Silviculture
The science of controlling the establishment, composition, and growth of forests.

Sinkhole
See doline.

Site Preparation
Manipulation of the vegetation or soil of an area prior to planting or seeding. The manipulation follows harvest, wildfire, or construction in order to encourage the growth of favored species. Site preparation may include the application of herbicides; burning or cutting of living vegetation that competes with the favored species; tilling the soil; or burning of organic debris (usually logging slash) that makes planting or seeding difficult.

Slash
The debris left on the ground after logging, pruning, or brushcutting or as a result of storm, fire, girdling, or poisoning. It includes logs, uprooted stumps, bark, and branches.

Slip plane
Closely spaced surfaces along which differential movement takes place in rock. Analagous to surfaces between playing cards.

Smolt
Young salmon or trout which move from freshwater streams to saltwater.

Snag
A standing dead tree, usually greater than 5 feet tall and 6 inches in diameter at breast height.

Soil Productivity
Capacity of a soil to produce plant growth, due to the soil's chemical, physical, and biological properties.

Soil Texture
Relative amounts of sand, silt, and clay in a soil. Coarse-textured soils are generally considered sandy and often contain gravel of various sizes. Fine-textured soils are considered very fine, sandy, silty, or clayey.

Solum
The upper and most weathered part of the soil profile; the A and B horizons.

Specified Road
Road built for long-term management of the forest as part of a timber sale contract.

Stand (Tree Stand)
A group of trees occupying a specific area and sufficiently uniform in composition, age arrangement, and condition as to be distinguishable from the forest in adjoining areas.

Standard
A course of action or level of attainment required by the Forest Plan to promote achievement of goals and objectives.

State Historic Preservation Officer (SHPO)
State appointed official who administers Federal and State programs for cultural resources.

State Selection
Application by Alaska Dept. of Natural Resources to the USDI Bureau of Land Management for conveyance of a portion of the 400,000-acre State entitlement from vacant and unappropriated National Forest System lands in Alaska, under the Alaska Statehood Act.

Stocking
The basal area or number of trees required to fully use the growth potential of the land.

Stream Classes
See Aquatic Habitat Management Unit.

Structural Diversity
The diversity of forest structure, both vertically and horizontally, which provides for a variety of forest habitats such as logs and multi-layered forest canopy for plants and animals.

Stumpage
The value of timber as it stands uncut, in dollar value per thousand board feet.

Subsistence Use
The customary and traditional uses by rural Alaskan residents of wild renewable resources for direct personal or family consumption as food, shelter, fuel, clothing, tools, or transportation; for the making and selling of handicraft articles out of non-edible byproducts of fish and wildlife resources taken for personal or family consumption; and for customary trade.

Subsistence Use Area
Important Subsistence Use Areas include the “most reliable” and “most often hunted” categories from the Tongass Resource Use Cooperative Survey (TRUCS) survey and from subsistence survey data from ADF&G, the University of Alaska, and the Forest Service, Region 10. Important use areas include both intensive and extensive use areas for subsistence harvest of deer, furbearers, and salmon.

Substantive Comment
A comment that provides factual information, professional opinion, or informed judgement germane to the action being proposed.

Succession
The ecological progression of community change over time, characterized by one species or group of species replacing another until a relatively stable climax community is reached.

Suitable
Commercial Forest land identified as having both the biological capability and availability to produce industrial wood products.

Sustained Yield
The amount of renewable resources that can be produced continuously at a given intensity of management.

Temporary Road
See Roads.

Thinning
The practice of removing some of the trees in a stand so the remaining trees will grow faster due to reduced competition for nutrients, water, and sunlight. Thinning may also be done to change the characteristics of a stand for wildlife or other purposes. See also, commercial thinning, precommercial thinning.

Threatened Species
Plant or animal species likely to become endangered throughout all or a significant portion of their range within the foreseeable future, as defined in the Endangered Species Act of 1973, and which have been designated in the Federal Register by the Secretary of the Interior as threatened species. (See also, endangered species, sensitive species.)

Tiering
Eliminating repetitive discussions of the same issue by incorporating by reference the analyses in an environmental impact statement of broader scope; e.g., this document is tiered to the environmental analyses of the EIS for the Tongass Land Management Plan, as amended.

Till
An unstratified deposit of gravel, boulders, sand, and finer materials which has been transported and deposited by a glacier.

Timber Appraisal
Establishing the fair market value of timber by taking the selling value minus manufacturing costs, the cost of getting logs from the stump to the manufacturer, and an allowance for profit and risk.

Timber Entry
A term used to refer to how far into the timber rotation an area is on the basis of acreage harvested. For example, if an area is being managed for three entries over a 100-year rotation, the first entry would be completed when one-third (approximately 33 percent) of the available acreage is harvested (usually in 30-40 years): the second entry would be completed when two-thirds (approximately 66 percent) of the available acreage is harvested (usually 60-70 years); the third entry would be completed when all of the available acreage is harvested (at the end of the rotation).

Timber Production
The purposeful growing, tending, harvesting, and regeneration of regulated crops of trees to be cut into logs, bolts, or other round sections for industrial or consumer use.

Tongass Land Management Plan (TLMP)
The 10-year land allocation plan for the Tongass National Forest that directs and coordinates planning, the daily uses, and the activities carried out within the Forest. Currently under revision.

Tongass Resource Use Cooperative Survey (TRUCS)
A study on subsistence uses which was used for evaluating the effects of the proposed action in this EIS.

Turbidity
An indicator of the amount of sediment suspended in water.

Understory
The trees and shrubs in a forest growing under the canopy or overstory.

Uneven-aged Management
Forest management techniques which simultaneously maintain continuous high-forest cover, recurring regeneration of desirable species, and the orderly growth and development of trees through a range of diameter or age classes. Cutting is usually regulated by specifying the number or proportion of trees of particular sizes to retain within each area, thereby maintaining a planned distribution of size classes.

Unsuitable
Forest land withdrawn from timber utilization by statute or administrative regulation; for example, Wilderness, or identified as not appropriate for timber production in the forest planning process.

Utility Logs
Logs that don't meet sawlog grade but are suitable for production of useable pulp chips.

Value Comparison Unit (VCU)
Areas which generally encompass a drainage basin containing one or more large stream systems; boundaries usually follow easily recognizable watershed divides. Provide a common set of areas for resource inventories and interpretations.

Viable Population
The number of individuals of a species required to ensure the continued long-term existence of the population in natural, self-sustaining populations, adequately distributed throughout their region.

Viewshed
An expansive landscape or panoramic vista seen from a road, marine waterway, or specific viewpoint.

Visual Quality Objectives (VQO's)
Measurable standards reflecting five different degrees of landscape alteration based upon a landscape's diversity of natural features and the public's concern for high scenic quality. The five categories of VQOs are:
Preservation: Permits ecological changes only. Applies to Wilderness Areas and other special classified areas. Management activities are generally not allowed in this setting.
Retention: Provides for management activities that are not visually evident to the casual Forest visitor.
Partial Retention: Management activities remain visually subordinate to the natural landscape.
Modification: Management activities may visually dominate the characteristics landscape. However, activities must borrow from naturally established form-line color and texture so that the visual characteristics resemble natural occurrences within the surrounding area when viewed in the middleground distance.
Maximum Modification: Management activities may dominate the landscape but should appear as a natural occurrence when viewed as background.

V-notch
A deeply cut valley along some waterways, generally in steep, mountainous terrain, that would look like a "V" from a frontal view.

Volume Class
Used to describe the average volume of timber per acre in thousands of board feet (MBF). The seven volume classes include:
Classes 1 to 3: Less than 8 MBF/acre (cleared land, seedlings, or pole timber stands).
Class 4: 8 to 20 MBF/acre.
Class 5: 20 to 30 MBF/acre.
Class 6: 30 to 50 MBF/acre
Class 7: 50+ MBF/acre

Watershed
The area that contributes water to a drainage or stream; portion of a forest in which all surface water drains to a common point. Can range from a few tens of acres that drain a single small intermittent stream to many thousands of acres for a stream that drains hundreds of connected intermittent and perennial streams.

Wetlands
Areas that are inundated by surface or groundwater frequently enough to support vegetation that requires saturated or seasonally saturated soil conditions for growth

and reproduction. Generally include: swamps, marshes, bogs, and similar areas such as sloughs, potholes, wet meadows, river overflows, mudflats, and natural ponds.

Wild and Scenic Rivers
Rivers or sections of rivers designated by congressional actions under the 1968 Wild and Scenic Rivers Act, or by an act of the legislature of the state or states through which they flow. May be classified or administered as Wild, Scenic, or Recreational.

Wilderness
Areas designated by congressional action under the 1964 Wilderness Act. Wilderness is defined as undeveloped federal land retaining its primeval character and influence without permanent improvements or human habitation. Wildernesses are protected and managed to preseve their natural conditions, which generally appear to have been affected primarily by the forces of nature with the imprint of human activity substantially unnoticeable; have oustanding opportunities for solitude or a primitive and unconfined type of recreation; are of sufficient size to make practical their preservation, enjoyment, and use in an unimpaired condition; and may contain features of scientific, educational, scenic, or historical value as well as ecologic and geologic interest. In Alaska, Wilderness has been designated by TTRA and ANILCA.

Wildlife Analysis Area (WAA)
A division of land used by the USDA Forest Service for wildlife analysis.

Wildlife Habitat
The locality where a species may be found and where the essentials for its development and sustained existence are obtained.

Wildlife Habitat Management Unit (WHMU)
An area of wildlife habitat identified during the IDT process as having values important to wildlife.

Windfirm
Configuration of harvest units so as not to create an opening which exposes the adjacent stand of timber to the direction of the major prevailing storm wind.

Windthrows
Areas where trees are uprooted, blown down, or broken off by storm winds.

Winter Range
An area, usually at lower elevation, used by big game during the winter months.

Withdrawal
The withholding of an area of Federal land from settlement, sale, location, or entry under some or all of the general land laws for the purpose of limiting activities under those laws in order to maintain other public values in the area.

Xylem
Woody tissue of plants that conducts water and substances in solution.

Yarding
Hauling timber from the stump to a collection point.

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Appendices

Appendix A

Reasons for Scheduling the Environmental Analysis of the Central Prince of Wales Project Area

Reasons For Scheduling The Environmental Analysis Of The Central Prince of Wales Project Area

KPC Long-term Timber Sale Contract Offerings

This appendix explains why the Central Prince of Wales Project Area is scheduled for environmental analysis at this time.

Summary

Reasons for scheduling the Central Prince of Wales Project Area at this time, for detailed consideration of timber harvest under the Ketchikan Pulp Company Long-term Timber Sale Contract, may be summarized as follows:

1. The Central Prince of Wales Project Area is within the designated primary sale area for the Ketchikan Pulp Company Long-term Timber Sale Contract, and contains a sufficient amount of harvestable timber volume designated as LUD III or IV, and therefore appropriate for harvest under the Tongass National Forest Land Management Plan (TLMP). Available information indicates harvest of the amount of timber being considered for this project can occur consistent with Forest Plan Standards and Guidelines and other requirements for resource protection. Consideration of areas outside the designated sale area at this time would not meet Ketchikan Pulp Company Contract requirements and is otherwise not necessary or reasonable.

2. Other areas with available timber inside the designated sale area will be necessary for harvest within the remainder of the Ketchikan Pulp Company Contract term (by 2004) in order to meet contract volume requirements. Effects on subsistence resources are projected to differ little according to which sequence these areas are subjected to harvest. Harvesting other areas on the Tongass National Forest with available timber is expected to have similar potential effects on resources, including those used for subsistence because of widespread distribution of subsistence use and other factors. Harvest of these other areas is foreseeable, in any case, over the forest planning horizon under either the existing or proposed revised Forest Plan.

3. Providing substantially less timber volume than required by the Ketchikan Pulp Company Contract in order to avoid harvest in the Central Prince of Wales Project Area or other project areas would not meet contract requirements and is otherwise not necessary or reasonable.

4. It is reasonable to schedule harvest in the Central Prince of Wales Project Area at present rather than other areas in terms of previous harvest entry and access, level of controversy over subsistence and other effects, and the ability to complete the National Environmental Policy Act (NEPA) process and make timber available to meet contract requirements by the time it is reasonably necessary to do so. Other areas that are reasonable to consider for harvest in the near future are the subject of other project EISs that are currently ongoing or scheduled to begin soon.

More detail regarding the scheduling of the environmental analysis for the Central Prince of Wales Project Area is presented in this appendix in three subsections:

Ketchikan Pulp Company Contract Requirements
Tongass Land Management Plan
Forest Plan Implementation

Ketchikan Pulp Company Contract Requirements

Contract Background

In 1951, the Forest Service and Ketchikan Pulp Company (APC) entered into a contract for sale and harvest of timber in Southeast Alaska for a 50-year period beginning in 1954 and ending in 2004. A primary function of this long-term contract was to "establish a new industrial enterprise which will be an important and significant step in the industrial development of Alaska" (Forest Service 1956).

The current management situation consists of a valid contract between the Forest Service and KPC, contract number A10fs-1042. This contract bestows rights and obligations on both parties. One obligation for the Forest Service is to provide the agreed upon volume from an identified contract sale area on the Tongass National Forest. Contract section B0.62 states in part "Forest Service shall seek to specifiy sufficient Offerings to maintain a Current Timber Supply in all Offering Areas that total at least three years of operations hereunder or until the contract termination date, whichever comes first, and which meets the the production requirements of Purchaser's manufacturing facilities." This three year supply equates to approximately 615 million board feet.

"Current Timber Supply" is defined in the contract generally as timber which the Forest Service has specified according to Forest Service planning procedures and for which the NEPA process has been completed. The Forest Service specifies timber through approving in writing a timber "Offering" under the contract, comparable to an independent timber sale. This approval in writing is represented by issuance of an "A Division" contract document for the Offering. An EIS such as the Central Prince of Wales Project Area EIS may cover one or up to several such Offerings, which may be specified by the Forest Service and therefore added to the contract "Current Timber Supply" concurrently or sequentially after issuance of the Record of Decision for the Project. Generally, layout on the ground of roads and harvest units selected in the Record of Decision (ROD) will be completed for each Offering prior to issuance of the "A Division" approval document.

The Forest Service Timber Sale Preparation Handbook (FSH 2409.18 Chapter 10) details the process utilized to prepare timber sales. This process also guides the preparation of timber Offerings under the KPC Contract. The timber sale preparation process is summarized below. Included in brackets is information describing modifications to the process specific to the KPC Contract. The Handbook states:

> The timber sale preparation process begins with the identification of the sale area and ends with the award of the timber sale contract [as described above, the process for the KPC Contract ends with the issuance of an "A Division" contract document for the Offering]. These activities pass through specific stages, called "gates", each of which requires specific outputs before proceeding to the next gate. . . Following are descriptions of work processes at each gate.

> Gate 1. Begin sale preparation activities with scoping or position statement development. Identify the purpose and need for the project, public issues, interested outside parties, management issues, resource opportunities in the sale area, a range of possible volume targets, and initial transportation system needs. . .
>
> Gate 2. During the sale area design (environmental analysis) phase, develop alternative designs and analyze them for environmental effects. Concurrently, develop an analysis file to store the information that is gathered. Once a course of action is selected, develop a sale implementation plan that provides detailed instructions for field layout of all sale elements. The end product of the sale area design phase is the selection of the preferred alternative and signature of the decision notice by the official authorized to approve the project. . .
>
> Gate 3. Activities leading to sale plan implementation include the data gathering and the on-the-ground marking, designating, and delineating needed to properly support the appraisal, the preparation of the contract, and post-award sale administration efforts. The sale passes through gate 3 when the field work is completed. . .
>
> Gate 4. After gathering all necessary engineering design work, cruise (volume) information, logging costs, environmental protection costs, and other elements of the timber appraisal. . . [a final timber appraisal is prepared for the offering(s) and an "A Division" contract document is issued].

Contract provisions require KPC to harvest timber, construct and operate a mill for primary manufacture and to recruit labor from residents of Southeast Alaska. To fulfill this obligation KPC operates a sawmill and a pulp mill in Ketchikan and a sawmill in Metlakatla.

Why Areas Outside The Primary Sale Area Boundary Are Not Considered In Detail

Since authorization of the KPC contract in 1951, several laws have changed the land base from which the authorized timber volume could be removed. The Alaska Native Claims Settlement Act (ANCSA) authorized substitution to replace areas selected by the Native Companys. The Alaska National Interest Lands Conservation Act (ANILCA) authorized substitution for areas designated by Congress as Wilderness in that statute which were in the primary sale area. The substitutions for Native selections and Wilderness selections were accomplished prior to the Central Prince of Wales Project Area environmental analysis process.

Section B0.3 of the contract, *Description of Timber*, states in part:

> The Ketchikan Pulp & Paper Company . . . ,hereby agrees to purchase from an area definitely designated on the attached maps which are part of this agreement, within pulptimber Allotments E, F, and G. . . The estimated amount to be cut under the methods of marking described in B2.3 is 1,500,000,000 cubic feet of western hemlock, Sitka spruce, western redcedar, Alaska cedar, and other species of timber, more or less.

Section B0.31 of the contract, *Additional Areas*, states in part:

> In the event the quantity of timber available for cutting within the above described area is insufficient for full scale operation until June 30, 2004 . . . the Regional

Forester shall designate additional cutting areas within Pulptimber Allotments E, F, and G to meet such needs of such plants for the priod ending June 30, 2004, provided, that the Regional Forester is not obligated to make available for cutting more than the 1,500,000,000 cubic feet of material covered by this agreement. . .

Section B0.61 of the Contract, *Timber Offering Schedule*, provides in part:

"To the extent authorized by law, Offering Areas may be identified for harvest outside the sale area, as needed to meet sale volume requirements."

The Central Prince of Wales Project Area lies within the "primary sale area" in Allotments E and G described in contract section B0.3. Current data indicates that there remains sufficient timber available within the designated sale area, including the additional areas described in Contract section B0.31 above, to provide the remaining unharvested portion of the total contract volume of 1,500,000,000 cubic feet, consistent with Forest Plan Standards and Guidelines and other requirements for environmental protection. The most recent Supplement to the Draft EIS for the Tongass Land Management Revision (TLMP SDEIS), which considers reductions in timber base due to the Tongass Timber Reform Act (TTRA), indicates this for the "current direction" alternative. For the current preferred alternative for the TLMP revision, the TLMP SDEIS indicates that there is at present easily enough available volume within the primary designated sale area to meet contract volume requirements for the next several years at least, while still meeting all constraints associated with the alternative. At some point in the future however, volume will also be required from the contingency areas to fulfill the contract volume requirments. This evaluation is incorporated by reference and further described in the last section in this Appendix, *Forest Plan Implementation*.

Therefore, providing volume outside of the primary sale area is not necessary at this time under the terms of the contract. Modifying the contract does not meet the purpose and need for the project. Although KPC has indicated that the Forest Service has the discretion to consider obtaining volume from outside the designated sale area, it has not expressed an interest obtaining timber from other areas in lieu of the Central Prince of Wales Project Area. The criteria for modification in 36 CFR 223.112,113 have not been met, considering the information in the TLMP SDEIS, and this EIS. Congress in enacting the Tongass Timber Reform Act declined to modify the contract sale area, and by directing in section 301(e) of the statute that the Secretary of Agriculture report to Congress on the effects of eliminating the sale area, indicated an intent to reserve this decision to the legislature.

Why Providing Less Than The Contract Volume Was Not Considered In Detail

Congress in section 301(e) of the TTRA also indicated its intent to reserve to itself the question of providing less than the contract volume obligation to KPC. Providing less than the contract volume would not meet the purpose and need for the Central Prince of Wales Project. The Forest Service can expect a large monetary claim from KPC for not meeting contract volume obligations, for which there is no current funding. To the contrary, recent federal appropriations legislation has dedicated additional money to providing additional timber offerings to KPC and other Tongass National Forest timber purchasers. Volume from independent timber sales or sources outside the Tongass National Forest do not fulfill KPC Contract requirements. In any case, there is not sufficient projected volume from other sources to meet KPC volume requirements.

Logs from Native Company lands cannot substantially meet the total needs of KPC. Owners of private timberland are able to sell their sawlogs on the export market for much higher prices than can be paid by local manufacturing. KPC is not prohibited under the Contract

from purchasing timber from Native Companys or other sources, subject to the requirement that, ". . . at least three-fourths of the pulpwood requirements of the pulp manufacturing plant and other processing facilities operated in conjunction with this sale shall be cut from the areas covered by this agreement during the period prior to July 1, 1964, and during each 5-year operating period sebsequent to that date. " (KPC contract B0.53). There are no provisions in the Contract to offset such purchases by adjusting the Contract timber volume. Harvest from Native Company lands is decreasing, reducing potential pulp as well as sawlog availability from these lands (TLMP SDEIS page 3-339).

Canadian timber has been mentioned in the past as a source of supply for Southeast mills. Southeast Alaska pulp mills have purchased pulp logs from British Columbia (BC) in the past. However, the political and economic situation in British Columbia has changed to decrease the likelihood of substantial supply from this source. The June 1988 issue of British Columbia Lumberman, page W14, states that a substantial increase in demand for BC forest products is expected to decrease log exports. The Forest Minister stated: "Our main objective is to use BC timber to manufacture wood products in this province." It has been more recently stated that British Columbia is considering prohibiting log exports and is facing increased environmental pressures (TLMP SDEIS, page 3-339).

Trying to meet the long-term volume contractual obligations from outside the long-term timber sale boundaries would decrease the availability of timber for the independent timber sale program, including the Small Business Set Aside Program; obtaining a substantial portion of long-term contract timber from outside the designated sale areas would probably decrease the independent sale program by an equivalent amount under the current TLMP allowable sale quantity. Under the current Plan, an annual average of 271 MMBF net sawlog of the ASQ is needed to meet the long-term sale requirements, leaving an annual average of 179 MMBF net sawlog for the independent program.

The TLMP SDEIS (table 3-134, page 3-368) shows for the current Plan as amended by the TTRA (Alternative C) the contribution to ASQ net sawlog (MMBF) by Allotment Area. Contingency Areas of Allotment E, F, and G of the KPC contract area contribute 125 MMBF annual average (28%) to the ASQ. Designating any part of this volume for the long-term sale would directly reduce the portion of the ASQ available for the independent program. The timber volume included in the action alternatives in the Central Prince of Wales Project Area EIS and scheduled from this area in the TLMP for the long-term contract is greater than the current yearly size of the entire Small Business Administration timber sale program agreed to with the SBA, 80 MMBF. Section 105 of the Tongass Timber Reform Act reflects Congressional intent that the SBA program continue.

Lack of an adequate timber supply to support these programs could affect the existing mill infrastructures and employment. The TLMP SDEIS (table 3-118, page 3-337) shows that lumber mill capacity for independent operators is about 220 MMBF annually (380 MMBF minus the Wrangell and KPC Sawmills). During good market conditions, the short term sales program has purchased up to 174 MMBF and harvested up to 149 MMBF annually which translates into about 67 percent of the mill capacity (TLMP SDEIS, table 3-114, page 3-325). Therefore, under good market conditions, the existing infrastructure can absorb the available supply. Elimination of short term sales under the independent and set-aside programs would translate into a loss of between 815 and 1144 timber-related jobs (TLMP SDEIS page 3-370, 3-610).

Current Timber Supply And Contract Volume Needs

This section provides an updated look at the long-term contract timber volume projected to be available to KPC. It includes a tentative schedule projecting how volume is to be

made available to meet contract obligations which states; "Forest Service shall seek to to specify sufficient Offerings to maintain a Current Timber Supply in all Offering Areas that totals at least three years of operations hereunder or until contract termination date, whichever comes first, and which meets the production requirements of the Purchaser's manufacturing facilities." (Contract Section B0.62).

Generally, there is a need for approximately 2,500 million board feet of timber volume remaining over the life of the KPC contract. This equates to an average of approximately 205 million board feet per year. Table 1 shows the volume available as of January 1, 1992 and displays how timber volume would be scheduled through 2004 to help meet current timber supply needs.

Table 1
Current Timber Supply and Projected Harvest to 2004.[1]
(MMBF/YEAR)

Year	93	94	95	96	97	98	99	00	01	02	03	04
NEPA COMPLETED												
89-94	120											
Frosty	33											
Starfish	45											
12 Mile	12											
Shelter Cove	17											
NEPA REQUIRED												
CPOW	290											
North Revilla	200											
Polk Inlet	125											
Lab Bay		85										
Control Lake		187										
Upper Carroll		130										
Heceta			75									
Sea Level			67									
Three Creeks			49									
Vixen Inlet				175								

Year	93	94	95	96	97	98	99	00	01	02	03	04
Port Stewart				135								
Chasina					166							
Tuxekan					59							
Ratz					40							
North POW						103						
Moira						119						
South POW							80					
Honker							119					
Luck Lake								107				
Lower Carroll								41				
Chomondeley								75				
NEPA Cleared Volume	615	402	191	310	265	222	199	223				
Initial Wood Supply	230	640	837	823	928	988	1005	999	1017	812	607	402
Projected Harvest	205	205	205	205	205	205	205	205	205	205	205	205
Ending Wood Supply	640	837	823	928	988	1005	999	1017	812	607	402	197

Note: Approximately 197 MMBF of the above figures is anticipated to be included in the Ketchikan Area's independent sale program
Numbers shown in parentheses indicate EISs in progress.
[1] All volume figures shown include sawlog and utility volume and are in MMBF.

The Central Prince of Wales Project Area EIS offers volume to help meet KPC contract obligations starting in 1993. This amount of volume is reasonably necessary to help maintain a three year Current Timber Supply of at least 615 million board feet of timber. Based on the scenario shown in table 1, operations in Central Prince of Wales Project Area could begin in 1993 with all operations substantially complete by 1996.

Tongass Land Management Plan

TLMP As Amended Winter 1985-86

Chapter 1 of this EIS includes an explanation of how this project relates to the Tongass Land Management Plan. That section describes the Land Use Designations (LUDs) which allocate land areas to different types of management. Chapter 1 also explains that these LUDs were assigned to land areas known as Value Comparison Units (VCUs), and that one or more contiguous VCUs were formed into Management Areas (MAs). This section

also describes the management emphasis for the Management Areas likely to be affected by the Central Prince of Wales Project.

The Tongass Land Management Plan, As Amended Winter 1985-1986, not only detailed Management Direction/Emphasis for each Management Area, it also scheduled specific Management Activities for specific time periods. In particular it scheduled timber sale preparation activities for 1985-89 and 1990-94. Table 2 displays the Management Areas scheduled for timber sale preparation during 1990-94.

Table 2
TLMP, As Amended Winter 1985-86, Activity Schedule

Management Area	Name	Years Scheduled	Activity Scheduled
K03	El Cap/Whale Pass	90-94	Timber Sale Prep
K07	Tuxekan Narrows	90-94	Timber Sale Prep
K08	Honker/Sweetwater	90-94	Timber Sale Prep
K09	Clarence Strait	90-94	Timber Sale Prep
K10	Thorne Bay	90-94	Timber Sale Prep

The Allowable Sale Quantity (ASQ), calculated in TLMP and used in Congressional deliberations and decisions on ANILCA, assumed harvest in all LUD III and LUD IV VCUs, in compliance with the Southeast Area Guide, on a three entry, 100 year rotation. Some selected areas were scheduled for 4 entries in 120 years (LUD IV) and 6 entries in 200 years (LUD III) for visual considerations. A three entry rotation assumes the first entry will be made within 30 to 40 years. If areas are not entered, and the ASQ is harvested, other areas will have to receive a heavier entry, resulting in a pattern of high percentage first entries being established, and therefore creating conditions under which the three-entry rotation may not be achievable.

The TLMP as amended also scheduled as anticipated management outputs from the Ketchikan Area timber volume ranging from 195.0 million to 220.3 million annually (Tongass Land Management Plan Amended Winter 1985-86, page 5).

Supplemental TLMP Revision Draft EIS (TLMP SDEIS)

1. Sufficient Volume for KPC Contract Needs in TLMP SDEIS.

The TLMP SDEIS Chapter 3 section on timber (pages 3-354 and 355) provides the following summary statements in terms of the timber supply and the long-term timber sale programs.

> If utility volume is included, Alternatives B, C, D, and P would meet or exceed the projected demand for National Forest timber (400 MMBF). Alternative A would provide 89 percent of the projected demand.
>
> All of the first-decade Allowable Sale Quantity (ASQ, sawlog) in Alternative A would be needed to satisfy the long-term contracts; Alternative B would need 82 percent

of the ASQ; Alternative C, 69 percent; Alternative D, 66 percent; and Alternative P, 75 percent.

These statements show that timber supply exceeds the level which is required to satisfy the long-term timber sale contracts (both APC and KPC). The data to support these statements is displayed in table 3-127 on page 3-355 and table 3-135 on page 3-371 of TLMP SDEIS. Table 3-135, in particular, shows the Long-Term and Short-Term Sales program volumes for the decade.

TLMP SDEIS also presents a discussion of timber supply within the KPC long-term contract sale area. As of October 1990 (the date of the TLMP SDEIS analysis), the remaining KPC Long-term Timber Sale Contract volume requirement was 2,443 MMBF, including utility (TLMP SDEIS , table 3-116, page 3-329, table 3-133, page 3-366). TLMP SDEIS alternatives A, B, C, D, and P provide, respectively, 3,800 MMBF, 4,180 MMBF, 5,930 MMBF, 5,920 MMBF and 5,480 MMBF, including utility, from the KPC designated sale area (allotments E, F, and G (TLMP SDEIS, table 3-133, page 3-366). So the all alternatives in the TLMP SDEIS indicates more than sufficient timber remaining available in the designated KPC sale area to meet remaining contract volume requirements, consistent with resource protection requirements and other constraints projected in the document.

Further analysis in TLMP SDEIS is related to suitable-available acres. These are acres of forest that are identified as suitable for timber harvest and which are assigned management prescriptions within the TLMP SDEIS that allow consideration of timber harvest. For each alternative, TLMP SDEIS analysis confirms that the identified suitable-available acres contain more than enough potentially available timber within the sale area to meet the remaining volume commitment. These figures appear in table 3-134, pages 3-368 and 3-369, TLMP SDEIS and are summarized in the following table.

Table 3
Timber Volume Available Within The Contract Area

Alt.	Allotment Area	Suitable-Available (Acres)	Old Growth Standing Vol (MMBF)
A	E-Primary	141,194	2,098
	F-Primary	38,960	698
	G-Primary	101,493	1,499
	Rest of E	39,166	826
	Rest of F	129,743	2,891
	Rest of G	157,426	2,806
		-----------	--------
		607,982	10,818
B	E-Primary	154,484	2,408
	F-Primary	42,193	793
	G-Primary	122,586	1,868
	Rest of E	45,926	984
	Rest of F	147,347	3,291
	Rest of G	153,245	2,678
		-----------	--------
		665,781	12,022
C	E-Primary	169,584	2,772
	F-Primary	47,769	915
	G-Primary	139,423	2,223
	Rest of E	75,551	1,702
	Rest of F	234,232	5,367
	Rest of G	227,707	4,407
		-----------	--------
		894,266	17,386
D	E-Primary	179,257	2,931
	F-Primary	49,889	939
	G-Primary	145,925	2,356
	Rest of E	47,065	1,010
	Rest of F	213,401	4,853
	Rest of G	240,790	4,676
		-----------	--------
		876,327	16,765
P	E-Primary	161,578	2,586
	F-Primary	45,262	859
	G-Primary	135,737	1,401
	Rest of E	65,954	1,462
	Rest of F	217,768	4,981
	Rest of G	199,856	3,809
		-----------	--------
		826,155	15,098

Furthermore, TLMP SDEIS displays the number of acres of tentatively suitable lands that are scheduled to be harvested over the planning horizon for each Management Area (TLMP SDEIS, table 3-138, page 3-378). This table indicates that the scheduling of the Central Prince of Wales Project Area and other project areas within the KPC sale area to meet contract volume requirements over the next several years is anticipated. In addition, this table shows that there are adequate suitable acres in these Management Areas, scheduled to be harvested, to provide that volume. A portion of table 3-138 is displayed below in table 4. It displays, for Alternative P, the scheduled suitable acres by Management Area. Table 4 is similar to table 2 which showed the Management Areas scheduled for timber sale preparation during 1991-95. A comparison of these two tables indicates that the Management Areas identified as appropriate for timber harvest activities in the existing TLMP (as amended winter 1985-86) are also identified as appropriate in alternative P of TLMP SDEIS.

Table 4
TLMP SDEIS Alternative P Scheduled Acres (selected Management Areas)

Mgmt. Area	Name	Acres Scheduled	Percent Of MA	Total MA Acres
K03	El Capitan	50,923	46.8	108,805
K07	Tuxekan	74,553	63.0	118,310
K08	Honker	57,310	46.3	123,835
K09	Clarence	52,296	55.0	95,068
K10	Thorne Bay	19,694	40.9	48,194

2. Cumulative Effects

The TLMP SDEIS considers the cumulative effects for forest-wide acres managed for timber production for both the long-term and short-term timber sale programs. These effects are discussed on pages 3-371 through 3-381. Cumulative effects for other resources are discussed at the end of their respective sections.

Analysis points to the need to schedule harvest in VCUs assigned management prescriptions which permit consideration of timber harvest, including the VCUs within the Central Prince of Wales Project Area. These VCUs in the current Forest plan, and in the draft revised Forest Plan would be needed to help meet the Tongass National Forest Allowable Sale Quantity, and also the contractual timber volume needs for the KPC Long-term Timber Sale. The forest-wide cumulative effects analysis in the TLMP SDEIS supports the conclusion that this harvest can be accomplished within existing and proposed revised TLMP standards and guidelines and other requirements for resource protection.

3. Subsistence

With the passage of the ANILCA, Congress recognized the importance of subsistence resources to rural residents of Alaska. In particular, prior to any disposition of public lands,

an agency must first complete a subsistence effects evaluation, including consideration of the availability of other lands (ANILCA 810 (a)).

Based on a review of available harvest volumes for each VCU in the KPC contract area, it appeared that in order to meet contract volume commitments, most of the LUD III and IV VCUs would need some level of harvest prior to the end of the KPC contract in 2004. A tentative offering schedule was developed and approved for implementation based on this analysis. In short, almost all LUD III and IV VCUs in the KPC Long-term Sale would be scheduled for harvest within the next 10 to 15 years, indicating a level of impact to all subsistence use areas. However, the most significant impacts on the subsistence resource habitat would not occur until 20 to 30 years after the timber harvest when the second growth canopy closes. When those impacts to subsistence resources are viewed from a reference point 20 years in the future, the particular importance of which areas are scheduled first during a 5-year period appears to be minor.

In considering communities that may be most affected by any proposed timber harvest in the Central Prince of Wales Project Area, Coffman Cove, Craig, Hollis, Hydaburg, Kasaan, Klawock, Petersburg, Point Baker, Port Protection, Thorne Bay, Whale Pass, and Wrangell appear to have the strongest cultural and subsistence ties to the area. Each community has its own level of reliance on subsistence as well as its own level of reliance on the Central Prince of Wales Project Area for supplying subsistence resources. The following information about each communities subsistence use is a summary of more detailed information provided in chapters 3 and 4 of the Central Prince of Wales Project EIS.

Coffman Cove The alpine areas to the south are used for early season deer hunting. Fishing occurs in Eagle Creek and Hatchery Creek. The tidal flats extending east from Coffman Cove to Lake Bay and Barnes Lake are popular areas for waterfowl and bear hunting. Some trapping occurs along the shoreline of Sweetwater Lake, while the lower reaches of Logjam Creek and Sweetwater Lake are used for fishing. Eighty-one percent of Coffman Cove's deer came from the Project Area WAA's between 1987 and 1990. Analysis shows that there is an adequate number of deer to meet the current subsistence demand for deer now and through the year 2040, (Alternative P TLMP SDEIS); however, at some point in the future it may be necessary to restrict the sport harvest of deer and give the rural communities preference.

Craig Areas adjacent to the road system---Thorne River, Hatchery Creek, Logjam creek, Staney Creek and Sarkar Lake---are some of the major subsistence use areas within the CPOW project area. Twenty-eight percent of Craig's deer came from the Project Area WAA's between 1987 and 1990. Analysis shows that there is an adequate number of deer to meet the current subsistence and sporthunting demand for deer now and through the year 2040 (Alternative P TLMP SDEIS).

Hollis Areas within the project area used by Hollis residents include areas adjacent to the road system for deer hunting, and Staney Creek, Hatchery Creek, Logjam Creek, and Thorne River for fishing. Fifty-one percent of Hollis's deer came from the Project Area WAA's between 1987 and 1990. Analysis shows that there is an adequate number of deer to meet the current subsistence demand for deer now and through the year 2040, (Alternative P TLMP SDEIS); however, at some point in the future it may be necessary to restrict the sport harvest of deer and give the rural communities preference.

Hydaburg Hydaburg subsistence use within the Project Area is dispersed throughout the Project Area, according to TRUCS maps. Forty percent of Hydaburg's deer came from the Project Area WAA's between 1987 and 1990. Analysis shows that there is an adequate

number of deer to meet the current subsistence and sporthunting demand for deer now and through the year 2040, (Alternative P TLMP SDEIS).

Kasaan Areas used for subsistence purposes include Karta River for harvest of fish, particularly sockeye salmon; Salt Chuck for waterfowl and bear; and parts of Kasaan Peninsula for deer hunting. Sixty percent of Kasaan's deer came from the Project Area WAA's between 1987 and 1990. Analysis shows that there is an adequate number of deer to meet the current subsistence and sporthunting demand for deer now and through the year 2040, (Alternative P TLMP SDEIS).

Klawock Subsistence harvest methods within the community of Klawock have been changing since the road tie with Hollis was made in 1984. Prior to that time subsistence harvest was mostly tied to boating activities. Since road access to the rest of the island has been available to the residents of Klawock, there has been a shift from using boats to harvest subsistence materials, to using trucks and cars. Deer harvest takes places on the islands of Noyes, Lulu, San Fernando, San Juan Bautista, Suemez, Heceta, and St. Phillips. In the project area, deer harvest occurs along the entire road system (but primarily in the Staney Creek, Logjam Creek and Thorne River areas), and beach fringe areas. Duck and goose harvest occurs in Big Salt Lake. Thirty-two percent of Klawock's deer came from the Project Area WAA's between 1987 and 1990. Analysis shows that there is an adequate number of deer to meet the current subsistence demand for deer now and through the year 2040, (Alternative P TLMP SDEIS); however, at some point in the future it may be necessary to restrict the sport harvest of deer and give the rural communities preference.

Petersburg Residents of Petersburg reported in the TRUCS survey that they used the entire area from Big Salt Lake east to Thorne Bay, north to the Sarkar Lake/Coffman Cove area for deer hunting.

Port Protection/Point Baker While the most important subsistence use areas for Port Protection and Point Baker (North end of Kosciuski and Prince of Wales islands) are outside of the Project Area, several areas within the Project Area are also important hunting and fishing locations for the two communities, including Whale Pass, Deweyville/Sarkar Lake, Stevenson Island, and Ratz Harbor.

Thorne Bay The extensive road system adjacent to the community provides numerous opportunities for residents to gather firewood, trees to saw into lumber for homebuilding, and access to hunting and fishing areas throughout the Project Area. Some trapping also occurs along the road system and beach fringe areas. Eighty-seven percent of Thorne Bay's deer came from the Project Area WAA's between 1987 and 1990. Analysis shows that there is an adequate number of deer to meet the current subsistence demand for deer now and through the year 2040 (Alternative P TLMP SDEIS); however, at some point in the future it may be necessary to restrict the sport harvest of deer in order to give rural communities priority.

Whale Pass The extensive road system adjacent to the community provides access to hunting and fishing areas throughout the Project Area. In addition to areas adjacent to the road system, the Naukati/Staney Creek area is used for deer hunting and fishing. Seventy-one percent of Whale Pass's deer came from the Project Area WAA's between 1987 and 1990. Analysis shows that there is an adequate number of deer to meet the current subsistence and sporthunting demand for deer now and through the year 2040 (Alternative P TLMP SDEIS).

Wrangell Residents of Wrangell used areas adjacent to the major road system and beach fringe within the Project Area for deer hunting, according to the TRUCS survey. Twenty percent of Wrangell's deer came from the Project Area between 1987 and 1990. Analysis shows that there is adequate deer available to meet the current level of harvest for subsistence and nonsubsistence use through the year 2040.

As a result of several considerations, including the availability of subsistence resources in undisturbed areas of Prince of Wales Island, including LUD I and LUD II areas within or adjacent to the Project Area (such as the Sarkar and Karta drainages), the relative independence of most communities from subsistence resources in the Project Area, as well as analysis contained in the Tongass Land Management Plan SDEIS, the Forest Service determined to schedule an environmental analysis of the Central Prince Wales Project Area ahead of other Project Area analyses. Subsequent Projects including Lab Bay, Polk Inlet, North Revilla, Port Stewart, Vixen Inlet, Upper Carroll, Ratz Harbor, Heceta Island, Control Lake, Three Creeks, and Sea Level will undergo environmental analysis within the next 3 to 5 years.

Extensive forestwide cumulative effect analysis has been included in the TLMP SDEIS (TLMP SDEIS pages 3-628 through 3-765). That analysis, and the tables of data shown in appendix K of TLMP SDEIS are incorporated by reference into this document. The data in appendix K and L indicates subsistence hunting of deer and other uses in virtually every area of the Tongass with substantial quantities of harvestable timber. The following information is extracted directly out of the Tongass Land Management Plan Revision, Supplement to the Draft Environmental Impact Statement, pages 3-762 and 3-763:

> In conducting the subsistence evaluation it is determined that, in combination with other past present and reasonably foreseeable future actions, none of the alternatives would pose a significant possibility of significant restriction for salmon, other finfish, marine mammals, invertebrates, plants, mountain goat, moose, waterfowl, sea birds, or other small game. Together these resources account for an average of 79 percent of the total harvest of subsistence resources (Kruse and Muth, 1990).
>
> In considering the impacts of future actions that may take place under the proposed alternatives on deer, two types of analysis was conducted. Potential effects were first determined for those WAAs where residents have successfully harvested deer, then for those WAAs where residents have ever gone to harvest deer. Both 10 percent and 20 percent harvest levels of the deer population were used.
>
> Considering only those WAAs where residents successfully harvested deer and assuming a harvest level of 10 percent of the population, there would be sufficient deer in all alternatives for the next 50 years to meet all subsistence needs for all communities except Gustavus, Hoonah, Kake, Pelican, Sitka, and Yakutat (appendix K). For these communities, there would be insufficient habitat capability to support harvest by all subsistence users (regardless of the community of orgin). However, at 20 percent of the population, all subsistence needs for these communities would be met by all alternatives for the next 50 years (appendix K).
>
> If instead of considering only those WAAs in which hunters were successful, we consider all WAAs ever hunted by community residents, then there would be sufficient deer habitat capability to support all subsistence hunters in the WAAs used for hunting by all subsistence communities except for Pelican and Gustavus. If instead of assuming a 10 percent harvest level, a 20 percent harvest level is used, there would be sufficient habitat capability to support all subsistence harvest in all WAAs used for hunting by all subsistence communities.

As a result of the analysis of the impacts of projects that would be permissible under each of the alternatives considered for adoption in the Forest Plan, it has been determined that all of the alternatives, if all permissible projects were fully implemented, have the potential to impact subsistence uses of deer, brown bear, and furbearers (specifically martens) due to potential effects of projects on abundance/distribution, and competition.

The analysis shown in chapter 3 of this Project EIS is supported by the analysis shown above in the TLMP SDEIS. The conclusion stated above, "it has been determined that all of the alternatives, if all of the permissible projects were fully implemented, have the potential to impact subsistence uses of deer. . .", supports the conclusion that any environmental analysis area within the Tongass would have a similar chance of having a significant possibility of a significant restriction on subsistence resources for Sitka Black-tailed deer, and other mammals.

The analysis for ANILCA section 810 are shown in the Subsistence section of chapter 4, in this EIS. The determinations made from the ANILCA section 810 analysis and findings are a part of the Record of Decision for this project and were developed in conjunction with the Final EIS.

Forest Plan Implementation

Review of Available Volume

A review was conducted of each VCU within the designated sale area for available volume. This analysis was based on computer inventories and Allowable Sale Quantity (ASQ) calculations from TLMP Draft Revision (1991a).

The review used the following guidelines to identify likely areas to schedule for environmental analysis in the near future:

(1) Evaluate by area the total available volume within the designated sale area. Between 1991 and 1993, there is a need to identify a potential harvest of 700 MMBF.

(2) Identify a tentative operating schedule which addresses volume to be offered from the Ketchikan Area.

(3) Prepare a schedule of environmental analysis areas which shows how the Ketchikan Area will meet the tentative operating schedule from 1991 through the end of the contract. This schedule must provide a minimum of 615 MMBF 'current timber supply' through the end of the contract.

The results of the first step by the working group analysis are presented in table 5. The results of this volume review, further supported by TLMP revision information, provided the basis for scheduling the next series of environmental analyses.

Table 5
Available Volume By VCU In The KPC Contract Boundary (9/89).

Project Area	MAs In Analysis Area	(MMBF)
AA I Cental Prince of Wales		
Central Prince of Wales	K03 (Portion), K07, K08, K09, K10	291
Ratz (2nd Entry)	K09 (Portion)	40
Honker (2nd Entry)	K08 (Portion)	119
Luck Lake (2nd Entry)	K08 (Portion), K09 (Portion)	107
Tuxekan (2nd Entry)	K07	59
AA 2 - Lab Bay		
Lab Bay	K01, K03 (Portion)	85
North POW (2nd Entry)	K01, K03 (Portion)	103
AA 3 - Polk Inlet		
Polk Inlet	K17, K18	125
Chomondeley (2nd Entry)	K18, K19	75
AA 4 - North Revilla		
North Revilla	K32 (Portion)	200
AA 6 - Sea Level		
Sea Level	K35	67
AA 7 - Control Lake		
Control Lake	K05, K08	187
AA 8 - Upper Carroll		
Upper Carroll	K32 (Portion)	130
AA 9 - Three Creeks		
Three Creeks	K39	49
AA 10 - Vixen Inlet		
Vixen Inlet	K29	175
AA 11 - Port Stewart		
Port Stewart	K30	135
AA 12 - Lower Carroll		
Lower Carroll	K34, K35	41
AA 13 - South POW		
South Pow	K28	80
AA 14 - Heceta		
Heceta	K11	75
AA 15 - Chasina		
Chasina	K24	166
AA 16 - Moira		
Moira	K25	119

Analysis Area Reviews

For each area identified as having sufficient volume available to consider for further environmental analysis at this time, a review was conducted to decide which areas to schedule first, considering the current TLMP and proposed revised TLMP schedule, and other factors described below. The results of this review and supporting reasons for each area appear below:

Central Prince of Wales - This project area is located within TLMP management areas K03, K07, K08, K09 and K10. The area has had extensive harvesting in the past. No additional log transfer facilities (LTF's) are required to harvest timber in this area. The majority of the road system is already in place, only limited additional road construction would be required. The area is entirely within the primary sale area. This area was give the highest priority due to it's location within primary sale area, ease of access, prior harvest and no additional LTF construction.

Polk Inlet - This project area is located within TLMP management area K17 and K18. The K17 portion of the area is located within the primary sale area. The area has had extensive harvesting in the past. Roads have been developed previously into the area but construction is difficult due to the terrain. A logging system transportation analysis was completed for the area as part of the 1989-1994 EIS. Three LTF's will be required enter the area but they have already been approved for construction under the 1989-1994 EIS and their required permits have been acquired or in process. The area was given a high priority since it has a large portion located within primary sale area, has had previous harvest, and has had prior road development. The area was not given highest priority due to LTF construction and difficult access.

North Revilla - This project area is located within TLMP management area K32. The area has had extensive harvesting in the past. It is located within the primary sale. A large amount of new road construction will be needed in the area. Road construction into the area is difficult due to steep terrian and unstable slopes. Nine LTFs will be required to access the area, of which three will require new construction. The area was given high priority since it is located within the primary sale area, has had prior harvest and road construction, and a logging system transportation analysis had already been completed for the area. It was not given highest priority due the requirement of three new LTFs and difficult road construction.

LAB Bay - This project area is located within TLMP management area K01 and K03. The area has had extensive harvesting in the past. One additional LTF will be required, other timber will utilize two existing LTF's. The vast majority of timber will have to pass through these two existing LTFs. The limited number of additional LTF's in the area could create a bottle neck getting wood from the field into the water. The area was given a high priority since it is in the primary sale area, has current road access, and has had previous harvest. It was not given highest priority due to a limited number of LTF's to put logs into the water.

Sea Level - This project area is located within TLMP management area K35. The area has had limited harvesting in the past. The area is within the KPC long term contract, however it is outside primary sale area boundary. Road construction is difficult in the area but no new LTF's are required to access the timber. This area was given a moderate priority for scheduling due to being within the timber sale contract and not requiring any new LTF's.

Control Lake - This project area is located within TLMP management area K08 and K05. The area has had extensive harvesting in the past. No additional log transfer facilities (LTF's) are required in to harvest timber in this area. The majority of the road system is already in place, only limited additional road construction would be required. The area is within the long-term contract area, but not within the primary sale area portion. This area was given a moderate priority since it had ease of access, prior harvest and no additional LTF construction but was not within the primary sale area.

Heceta - This project area is located within TLMP management area K11. The area has had extensive harvesting in the past. The area is within the KPC long term contract, however

it is outside primary sale area boundary. Remaining volume available for harvest in the area is low. The project areas is a small island off the west coast of Prince of Wales Island and faces the open ocean. This makes the logistics associated with timber harvest activities difficult. This area was given a moderate priority for scheduling due not being in the primary sale are, low potential volume, and difficult logistic problems.

Upper Carroll - This project area is located within TLMP management area K32. The area has had limited harvesting in the past. The area is within the KPC long term contract, however it is outside primary sale area boundary. Road access in the area is difficult. One new LTF will be required. Road construction associated with this project may help complete the linkage for the transportation utility corridor planned for the area. This area was given a moderate priority for scheduling despite the potential transportation utility corridor due difficult access and not being in the primary sale area.

Three Creeks - This project area is located within TLMP management area K39. The area has had limited harvesting in the past. The area is immediately behind the community of Ketchikan and as is heavily used for recreation. The area is within the KPC long term contract, however it is outside primary sale area boundary. This area was given a moderate priority for scheduling despite good timber harvest economics due to low potential volume and high recreation values.

Vixen Inlet - This project area is located within TLMP management area K29. The area has had limited harvesting in the past. There is potentially a large amount of volume available in the area, although it is somewhat scattered. This will require a high ratio of miles of road construction per MBF of timber harvest. The area is within the KPC long term contract, however it is outside primary sale area boundary. The project is on Cleveland Peninsula which has important wildlife and recreation values. There is currently no road access into the area. There are no existing LTF's and one new LTF would be required. This area was given a moderate priority for scheduling due the large amount of potential volume and since it is within the long term sale boundary. It was not given a high priority since it is not within the primary sale area and has high recreation and wildlife values.

Port Stewart - This project area is located within TLMP management area K30. The area has had limited harvesting in the past. There is potentially a large amount of volume available in the area, although it is somewhat scattered. This will require a high ratio of miles of road construction per MBF of timber harvest. The area is within the KPC long term contract, however it is outside primary sale area boundary. The project is on Cleveland Peninsula which has important wildlife and recreation values. There is currently no road access into the area. There are no existing LTF's and one new LTF would be required. This area was given a moderate priority for scheduling due the large amount of potential volume and since it is within the long term sale boundary. It was not given a high priority since it is not within the primary sale area and has high recreation and wildlife values.

Lower Carroll - This project area is located within TLMP management area K34 and K35. The area has had limited harvesting in the past. The area is within the KPC long term contract, however it is outside primary sale area boundary. The area was recently analyzed as part of the Shelter Cove EIS. As part of that EIS a logging system transportation analysis was developed for the area. Remaining volume potentially available for harvest from this area is low. This area was given a low priority for scheduling due to not being in the primary sale area, low amount of potential volume, and having been recently analyzed as part of another EIS.

South POW - This project area is located within TLMP management area K28. The area has had extensive harvesting in the past. The area is within the KPC long term contract,

however it is outside primary sale area boundary. There is no existing logging system transportation analysis available for the area. The area would require the construction of three new LTF's. Road construction in the area would be very difficult. The quality and quantity of timber in the area is not very high. The result is that timber harvest in the area is likely to be economically marginal. As a result of these factors, this area was given a low priority for scheduling.

Results of Analysis

Upon completion of the above analysis, four Project Areas were identified and scheduled for environmental analysis. The four timber projects were initiated which had a high priority and were within the KPC "Primary Sale Area". The KPC contract provides direction to seek to find timber supplies within the Primary Sale Area before seeking volume within contingency areas. These four projects were needed to produce sufficient volume to provide KPC with 205 MMBF for the 1993 logging season, as well as to provide a three-year timber supply of 615 MMBF. There WAS expected to be 120 MMBF of timber volume remaining from previous projects which will be available to KPC by the beginning of the 1993 operating season. Therefore, these four timber projects need to produce a total of 700 MMBF, which, when combined with the 120 MMBF currently available, will provide volume for the 1993 logging season, plus a three-year timber supply.

This 700 MMBF was divided among the four timber projects based on the size of the project areas, as well as on their relative abilities to produce timber volume in an expedient fashion. Other factors considered in making this volume determination for the CPOW project included: (1) this harvest level is consistent with the sale schedule in the TLMP (1979a, as amended); (2) sufficient volume has been determined to be available in the CPOW Project Area; (3) there is an extensive road network in place; (4) the number and location of Log Transfer Facilities (LTF's) is sufficient to handle this volume of timber within a three-year time frame; (5) there are existing KPC-operated logging camps within the CPOW area to handle this volume; and (6) the current Forest Plan (TLMP 1979a, as amended) calls for harvest in this Project Area.

When these four projects were initiated there was expected to be approximately 120 MMBF of timber volume (approximately 30 MMBF within the CPOW Project Area) remaining from a previous NEPA project (1989-94 LTS EIS) which would be available to KPC by the time the CPOW Final EIS is released. However, once these four projects were underway, delays were experienced in their completion. These delays were such that only limited volume could be made available from them for the 1993 logging season. This also had an effect of delaying when a 3 year timber supply could be achieved. In an effort to provide enough volume for the 1993 logging season, and to stay on schedule for attaining a three year timber supply, four independent sales were released to KPC. These sales total 107 MMBF and include: 12-Mile (12 MMBF), Frosty (33 MMBF), Shelter Cove (17 MMBF), and Starfish (45 MMBF). Frosty and Starfish are located on the Wrangell District of the Stikine Area.

Subsequently, a schedule of additional project level environmental analysis was identified for fiscal years 1993 through 2000 to complete the Long-term Sale. This schedule has been reviewed and reaffirmed and is shown in the following memo.

United States Department of Agriculture | Forest Service | Region 10 | Tongass National Forest, Ketchikan Area, Federal Building, Ketchikan, AK 99901

Reply To: 1950

Date: April 26, 1993

Subject: Timber Sale NEPA Documents

To: Forest Supervisor

The following schedule of NEPA documents represents the proposed NEPA analysis needed to fullfill the timber sale action plan. This memo is intended to update the October 10, 1992 sale schedule memo.

KETCHIKAN AREA DRAFT SALE SCHEDULE
NEPA DOCUMENT SUMMARY

Project Name	Begin Project (Gate 1)	Issue NOI (Gate 2)	Issue DEIS (Gate 2)	Issue FEIS (Gate 3)	Projected Volume
CPOW				7/93	290
North Revilla				7/93	200
Polk Inlet			6/93	9/93	125
Lab Bay			10/93	4/94	85
Control Lake	3/93	7/93	5/94	11/94	187
Upper Carrol	3/93	7/93	5/94	11/94	130
Heceta	3/93	7/94	5/95	11/95	75
Sea Level	3/93	7/94	5/95	11/95	67
Three Creeks	3/93	7/94	5/95	11/95	49
Vixen Inlet	5/93	7/95	5/96	11/96	175
Port Stewart	5/93	7/95	5/96	11/96	135
Chasina	3/96	7/96	5/97	11/97	166
Tuxekan	3/96	7/96	5/97	11/97	59
Ratz	3/96	7/96	5/97	11/97	40
North POW	3/97	7/97	5/98	11/98	103
Moira	3/97	7/97	5/98	11/98	119
South Pow	3/98	7/98	5/99	11/99	80
Honker	3/98	7/98	5/99	11/99	119
Luck Lake	3/99	7/99	5/00	11/00	107
Lower Carrol	3/99	7/99	5/00	11/00	41
Chomondeley	3/99	7/99	5/98	11/00	75

David Arrasmith

DAVID ARRASMITH
DT Planning Staff Officer

FS-6200-28(7-82)

Comments recieved on the Draft Environmental Impact Statement expressed a concern regarding the sustainability of the timber harvest levels. The concern was made for the Ketchikan Area as whole, as well as the distribution of the harvesting within the Area. To address these concerns additional analysis was performed to estimate Ketchikan Area wide timber harvest levels over the next 50 years by Management Area. This analysis was done by Management Area to give a spatial indication of where the harvests would occurr. It was done for 50 years since this is the estimated period until the second growth produced by earlier cutting would become available for harvest once again. The analysis was done using the suitable land base identifeid in Alternative P in the TLMP Revision as the best indicator of future land allocations affecting lands available for harvest. This analysis also assumes that; 1) price increases for wood products will occur resulting in making economically marginal lands possible to harvest, and 2) there will be no further reductions in the suitable land base due to legislation, Forest Planning, or other factors. The results of this analysis are displayed below in both millions of board feet per decade (MMBF/Decade) and millions of cubic feet per decade (MMCF). The analysis indicates that although timber harvest levels can be sustained Ketchikan Area wide, there will be some shifts through time as to where that harvest incurs.

Table 6
Distribution of Ketchikan Area's Timber Harvest Over the Next 50 Years
(MMBF/Decade & MMCF/Decade)

MANGEMENT AREA	1995-2004	2005-2014	YEARS 2015-2024	2025-2034	2035-2044
K01 Sumner	85/ 20	151/ 33	82/ 20	141/ 33	154/ 36
K03 El Capitan-Whale Pass	142/ 33	97/ 22	144/ 37	168/ 40	33/ 8
K04 Kosciusco East	0/ 0	47/ 10	63/ 15	35/ 8	28/ 7
K05 Kosciusco West	0/ 0	246/ 56	125/ 29	27/ 6	53/ 12
K07 Tuxekan Narrows	190/ 44	212/ 46	305/ 74	258/ 61	112/ 29
K08 Honker Sweetwater	331/ 77	127/ 28	97/ 24	233/ 54	237/ 60
K09 Clarence Strait	145/ 34	78/ 17	179/ 44	213/ 50	105/ 28
K10 Thorne Bay	30/ 7	56/ 13	90/ 23	61/ 15	33/ 8
K11 Heceta	75/ 17	236/ 54	91/ 23	49/ 11	28/ 7
K14 Craig	0/ 0	124/ 28	98/ 23	283/ 67	231/ 63
K15 Control	67/ 16	78/ 17	28/ 7	146/ 34	54/ 13
SUBTOTAL Thorne Bay R.D.	1065/248	1452/324	1302/319	1614/379	1068/271
K17 Hollis	20/ 5	45/ 11	36/ 9	131/ 31	129/ 32
K18 Scowl - W. Cholmondeley	155/ 36	212/ 46	142/ 32	50/ 11	168/ 46
K19 Spiral - Clover	25/ 6	13/ 3	0/ 0	3/ 1	46/ 13
K20 Sumez	0/ 0	39/ 9	5/ 1	83/ 19	30/ 7
K21 Sukkwan	0/ 0	18/ 4	33/ 8	229/ 52	199/ 52
K22 Dall Island	0/ 0	10/ 2	12/ 3	37/ 9	59/ 15
K24 Cholmondeley Sound	166/ 38	126/ 29	26/ 6	45/ 9	2/ -
K25 Moria	119/ 27	185/ 46	26/ 6	40/ 9	29/ 8
K28 Kegan	80/ 19	49/ 13	5/ 1	5/ 1	0/ 0
SUBTOTAL Craig R.D.	565/131	697/163	285/ 66	623/142	662/173

MANGEMENT AREA	1995-2004	2005-2014	YEARS 2015-2024	2025-2034	2035-2044
K29 North Cleveland	175/ 43	6/ 2	169/ 40	23/ 5	16/ 4
K30 South Cleveland	135/ 33	15/ 3	180/ 43	49/ 11	31/ 7
K32 West Revilla	330/ 78	83/ 19	85/ 23	66/ 16	287/ 68
K34 Swan Lake	0/ 0	4/ 1	9/ 2	0/ 0	0/ 0
K35 Carrolll - Thorne	75/ 18	102/ 24	275/ 66	28/ 7	116/ 27
K39 George Inlet	82/ 19	137/ 32	42/ 10	20/ 4	45/ 11
SUBTOTAL Ketchikan R.D.	797/191	347/ 81	760/184	186/ 43	495/117
K44 Hyder	0/ 0	1/ -	9/ 2	15/ 4	20/ 5
SUBTOTAL Misty Fiords	0/ 0	1/ -	9/ 2	15/ 4	20/ 5
GRAND TOTAL Ketchikan Area*	2427/569	2495/569	2354/569	2437/569	2246/569

* May not sum to total due to rounding.

APPENDIX B

Biological Assessment

Central Prince of Wales Final Environmental Impact Statement

BIOLOGICAL ASSESSMENT

FOR THE CENTRAL PRINCE OF WALES PROJECT AREA

UNITED STATES DEPARTMENT OF AGRICULTURE
TONGASS NATIONAL FOREST
KETCHIKAN AREA

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BIOLOGICAL ASSESSMENT
for the Central Prince of Wales Project Area

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This Biological Assessment was prepared for the Central Prince of Wales Project Area as required by Section 7 of the Endangered Species Act (as amended) and the USDA Forest Service threatened, endangered, and sensitive plant and animal species policy (FSM 2670). This assessment documents the occurrence of Federal and State threatened, endangered, and candidate species, critical habitats within the Project Area, and potential effects of the proposed actions on habitats or species.

An Environmental Impact Statement is being prepared for the Central Prince of Wales Project Area (CPOW). The action includes the harvest of approximately 9,557 to 10,700 acres of old-growth forest, construction of 90-119 miles of new roads, and the use of five existing log transfer facilities. The CPOW Project Area includes 321,866 acres bounded on the north by Neck Lake, bounded on the east by the shoreline (including Stevenson Island) to the end of Kassan Peninsula, bounded on the south by the Karta Wilderness, and on the west by the shoreline. Coastal activities (LTF's) will be centered in Thorne Bay, Coffman Cove, Whale Pass, Naukati, and Winter Harbor. The Project Area includes Wildlife Analysis Areas (WAA's) 1315, 1319, 1420, 1421, 1422, 1527, and 1530.

This Biological Assessment has been completed for the endangered humpback whale (*Megapter novaeangliae*), American peregrine falcon (*Falco peregrinus anatum*), and the Eskimo curlew (*Numenius borealis*); the threatened Arctic peregrine falcon (*Falco peregrinius tundris*), Aleutian Canada goose (*Branta canadensis leucopareia*), and the Steller sea lion (*Eumetopias jubata*); one candidate mammal species, one candidate frog species, four candidate plant species, and three candidate bird species.

I. IDENTIFICATION OF ENDANGERED AND THREATENED SPECIES AND/OR CRITICAL HABITATS FOR SUCH SPECIES WITHIN THE PROJECT AREA.

A. Federal Threatened, Endangered, and Candidate Species

Federal listed threatened and endangered species are those plants and animal species formally listed by the U.S. Fish and Wildlife Service (USFWS) or the National Marine Fisheries Service (NMFS), under the authority of the Endangered Species Act of 1973, as amended. An endangered species is defined as one which is in danger of extinction throughout all or a significant portion of its range. A threatened species is defined as one which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.

Candidate species are those being considered for listing as threatened or endangered by the USFWS or NMFS. A category 1 candidate is one for which the agency has sufficient data in its possession to supporting listing the species as threatened or endangered. Category 2 candidate species are those species for which there is information indicating the species might qualify for endangered or threatened status, but for which further evaluation is needed. Category 3 candidate species are species that were considered for listing as endangered or threatened, but are no longer under consideration.

Species listed as endangered or threatened are provided statutory protection under the Endangered Species Act of 1973, as amended; candidate species are not. Therefore, technically, under the Endangered Species Act, agencies have no legal obligation to take action on Category 2 or 3 species.

B. State of Alaska Endangered Species

The State of Alaska has an Endangered Species Law which authorizes the Commissioner of the Alaska Department of Fish and Game (ADF&G) to list Alaska endangered species.

Table 1 summarizes the threatened, endangered, and candidate species of animals and plants occurring on or near the CPOW Project Area which are under the jurisdiction of the USFWS or NMFS.

Table 1
Threatened, Endangered, and Candidate Species Occurring On or Near the Central Prince of Wales Project Area

SPECIES	STATUS			
	Federal			State
	Threatened	Endangered	Candidate	
Humpback whale		E		E
Steller Sea Lion	T			
American Peregrine Falcon		E		E
Arctic Peregrine Falcon	T			E
Aleutian Canada goose	T			E
Eskimo curlew		E		E
Marbled Murrelet			2	
Northern Goshawk			2	
Harlequin Duck			2	
Spotted Frog			2	
Prince of Wales Flying Squirrel			3	
Aster yukonensis			2	
Calamagrostis crassiglumis			2	
Carex lenticularis var. dolia			2	
Montia bostockii			2	

There has been no critical habitat officially designated for any of these species at this time in Southeast Alaska.

The USFWS has identified northern goshawk and marbled murrelet as being species of concern within the Central Prince of Wales Project Area (Holmberg March 5, 1992). The endangered American peregrine falcon may migrate through the Prince of Wales Island area, as may the Eskimo curlew, Aleutian Canada goose, and Harlequin duck (Holmberg March 5, 1992). There has been no evidence of the existence of any other listed species within the Project Area. The Peale's subspecies of the peregrine falcon nests on the outer islands west of the Project Area (Schempf 1981 and 1982). This species is not listed as endangered or threatened, but is covered by a provision of the "similarity of appearance" which broadens the scope of the

protection for all peregrine falcons. No harvest units for any of the alternatives are within two miles of any known nest sites of Peale's peregrine falcon.

The humpback whale (*Megaptera novaeangliae*) and Steller sea lion (*Eumetopias jubata*) were listed by the National Marine Fisheries Service (NMFS) in an assessment of the Project Area (Pennoyer February 6, 1992). During 1991, NMFS completed final recovery plans for the humpback whales. The Steller (northern) sea lion is currently listed as threatened (*Federal Register* Dec. 4, 1990; NMFS 1992). Presently, critical habitat has not been designated for either species (Pennoyer February 6, 1992).

No plant species known to occur in the Project Area have been determined to be threatened, endangered, or sensitive. Category 2 plants *Calamagrostis crassiglumis* and *Carex lenticularis* could potentially occur within the Project Area, but have not been documented.

No fish species known to occur in the Project Area have been determined to be threatened, endangered, or sensitive.

II. SPECIES ASSESSMENTS

HUMPBACK WHALE (*Megaptera novaeangliae*)

Distribution and Population

Humpback whales are the most abundant of the eight species of endangered whales that occur in Southeast Alaska waters. Their population in the North Pacific is about 1,200, which is about eight percent of the prewhaling population. These whales are regularly sighted in the Inside Passage and coastal waters of the Southeast Alaska panhandle from Yakutat Bay south to Queen Charlotte Sound. Humpback whales feed in Southeast Alaskan panhandle waters from about May through December, although some have been seen every month of the year. Peak numbers of whales are usually found in nearshore waters during late August and September, but substantial numbers usually remain until early winter. Baker et al. (1985) estimate that 300-350 humpback whales inhabit Southeast Alaska during the summer and fall.

The local distribution of humpbacks in Southeast Alaska appears to be correlated with the density and seasonal availability of prey, particularly herring (*Clupea harengus*) and euphausiids. Important feeding areas include Glacier Bay and adjacent portions of Icy Straight, Stephens Passage/Frederick Sound, Seymour Canal and Sitka Sound. Glacier Bay and Icy Straight appear to be an important feeding area early in the season, when whales prey heavily on herring and other small, schooling fishes. Frederick Sound is important later in summer, when whales feed on swarming euphausiids. During autumn and early winter, humpbacks move out of the Sound to areas where herring are abundant, particularly Seymour Canal. Other areas of Southeast Alaska may also be important for humpbacks and need to be evaluated. These include: Cape Fairweather, Lynn Canal, Sumner Strait, Dixon Entrance, the west coast of Prince of Wales Island, and offshore banks such as the Fairweather Grounds.

Because the humpback inhabits shallow coastal areas, it is increasingly exposed to human activity. Consequently, these whales may be more susceptible to confrontational disturbance, displacement, and loss of habitat from environmental degradation than some other whale species. Humpbacks summering in Southeast Alaska have been linked to each of three wintering areas in Mexico, Hawaii, and Asia.

Effects of CPOW Proposed Actions on Population or Habitat

The recovery plans for the humpback whale identified six known or potential categories of human impacts to these species: hunting, entrapment and entanglement in fishing gear, collisions with ships, acoustic disturbance, habitat degradation, and competition for resources with humans.

National Forest management activities which may have an effect on whale habitats or populations generally fall into the categories of acoustic disturbance and habitat degradation. These management activities include: the development and use of log transfer facilities (LTF's) and their associated camps, the movement of log rafts from log transfer facilities to mills, and the potential development of other docks and associated facilities for mining, recreation, and other forest uses and activities. Generally, with the development and use of LTF's and other docking facilities for projects, there is an associated increase in recreational boating in the immediate vicinity during the construction and use of the facilities.

Most of the information and data for whales in Southeast Alaska are associated with one species, the humpback whale, because it is the most abundant whale to occur in Southeast Alaska waters. The other seven species of whales are either present only seasonally as they migrate along the outer coastal areas, or are only occasionally found in the inside coastal waters of Southeast Alaska. The following discussion and analysis is primarily based on humpback whales, but is assumed to be applicable to the other species of whales.

Construction and operation of LTF's and other docking facilities are restricted to small, very localized areas of the marine environment. There are five LTF's currently on the Project Area. An estimated 2.5 acres of marine benthic disturbance associated are with these existing LTF's. No new LTF's are proposed for construction under the CPOW EIS.

There is little potential to directly affect whales with these facilities. During the summer of 1989, there was a report of a humpback whale entangled in some cables from an inactive LTF site on the Stikine Area. This is the only known direct effect incident related to LTF's.

Two potential indirect effects of LTF's and other docking facilities and associated activities have been identified: 1) effects on whale prey species, and 2) disturbances of whales by boat traffic associated with LTF's.

Effects on Prey. Nemoto (1970) noted that euphausiids and gregarious fish are the primary prey of humpbacks. Thirteen species of fish and 57 species of invertebrates were identified as humpback whale prey in Southeast Alaska. Humpbacks studied in Glacier Bay and Stephens Passage-Frederick Sound were found most frequently in areas of high prey density (Wing and Krieger 1983).

Construction and operation of all LTF's and similar facilities require U.S. Army Corps of Engineer and U.S. Environmental Protection Agency permits, and State of Alaska tidelands permits. The permitting process provides that construction and operation maintain water quality in the specific facility locations, and that marine circulation and flushing are maintained. All facilities must be in conformance with permit standards. Although the effects may vary locally, the major effect of leachates (ie. terpene, alpha-conindendric acid, alpha-conindendrin, hydroxymatairesinol, linoletic acid, and dehydroabientic acid) from stored log rafts, is upon invertebrates. Crustaceans, shrimp and crab larvae, seem especially sensitive (Pease 1973, Buchanan and Tate 1976). EPA measuring techniques may be required to monitor the LC_{50} levels at each LTF (Peltier and Weber 1985) in order to insure impacts are limited to the approved "zone of deposit". A local increase in the herring and herring egg fishery could also impact this food item.

Effects from Disturbance. Humpback whale response to nearby boating activity varies from no apparent response to pod dispersal, sounding, breaching, evasive underwater maneuvers, and maintaining distance

(Baker and Herman 1983, Baker et. al. 1982). Disturbance by boat activity has been suggested as one of the possible causes of observed changes in whale distribution in Southeast Alaska. Direct pursuit of whales by boats, and frequent changes in boat speed and direction appear to elicit avoidance behaviors more frequently than other types of boat traffic. However, whales may readily habituate to constant and familiar noise (Norris and Reeves 1978). Whales can be commonly found in some areas of Southeast Alaska which have considerable boat traffic. Whether they are habituated to boat traffic has not yet been documented. Adverse effects from current levels of boat traffic have not yet been documented.

Two basic types of boat activity associated with LTF's are log raft towing and recreational boating by workers. Log raft towing frequency would vary between camps, seasons, and years, with an average of about once a week during the working season (U.S.D.A. Forest Service 1989). Tug boats maintain relatively constant speeds and directions during log raft towing; constant speed and direction elicit less avoidance behavior from whales than other types of boating activity. Log raft towing routes are generally well established, and adverse effects from log raft towing have not been documented.

Recreational boating activity by camp residents would vary between seasons, years, and camps of different sizes. This activity would be concentrated near LTF sites, other docking facilities, and camps. It is estimated that most recreational boating would occur within a few miles of the site, few trips would be made over 10 miles, and activity greater than 30 miles from a site would be negligible. This boating would involve frequent changes in speed and direction and may include some small amount of whale pursuit, if the whales are within sight of the camp or an occupied boat. The effect of such recreational activity on whales would depend on many factors such as size of the bay, depth of the waters in the bay, number of boats, individual behavior responses of the whales, etc. At the present time, there is not a quantifiable way to estimate these possible effects.

The following Forest-wide standards and guidelines have been developed for application on all Forest Service permitted or approved activities and have been incorporated into the CPOW FEIS from the Supplement DEIS Tongass Land Management Plan by reference:

Provide for the protection and maintenance of whale habitats:

1. Avoid intentional aircraft flights below 500 feet above ground level in the known vicinity of whales on Forest Service permitted or approved activities, when weather ceilings permit.

2. Avoid intentional approach in a vessel of 100 feet or more in length to within 1/4 mile of whales on Forest Service permitted or approved activities, when safe passage exists.

3. Avoid intentional approach in a vessel of less than 100 feet in length to within 100 yards of whales on Forest Service permitted or approved activities, when safe passage exists.

No adverse effects on whales from implementation of Forest management activities are anticipated. Indirect effects may be associated with possible increased boating activity, but are mitigated by Forest Service standards and guidelines.

STELLER SEA LION (*Eumetopias jubata*)

Distribution and Population

The Steller (northern) sea lion ranges from Hokkaido, Japan, through the Kuril Islands and Okhotsk Sea, Aleutian Islands and central Bering Sea, Gulf of Alaska, Southeast Alaska, and south to central California.

There is not sufficient information to consider animals in different geographic regions as separate populations. The centers of abundance and distribution are the Gulf of Alaska and Aleutian Islands, respectively.

In 1990, because of an abrupt population decline observed over the last 31 years (primarily in the former Soviet Union, Gulf of Alaska, and Aleutian Islands), the NMFS listed the Steller sea lion as a threatened species thoughout its range. The number of sea lions observed on certain rookeries from Kenai Peninsula to Kiska Island declined by 63 percent since 1985 and by 82 percent since 1960. Significant declines have also occurred on the Kuril Islands. Information on population trends in Southeast Alaska is sketchy, but what data does exist suggests that Southeast populations are stable or perhaps slightly decreasing.

When the sea lion was given emergency listing as a threatened species in the *Federal Register* (April 5, 1990), buffer zones restricting human activities were established around rookeries west of 150 degrees west longitude (does not include Southeast Alaska). The closest Steller sea lion rookery to the CPOW Project Area is on Forrester Island. A recovery team has prepared a draft recovery plan.

A sea lion haulout, for sunning and resting, has been observed near the Project Area. Grindall Island at the south tip of Kasaan Peninsula is an important haulout area. Important food resources include salmon, eulachon, and cephalopod mollusks.

Effects of CPOW Proposed Actions on Population or Habitat

The NMFS provides a summary of factors affecting the Steller sea lion (*Federal Register* April 5, 1991). These factors include reductions in the availability of food resources, especially pollock, which is the most important prey species for sea lions; commercial harvests of sea lion pups; harvests for subsistence and for public display and scientific research purposes; predation by sharks, killer whales, and brown bear; disease; the inadequacy of existing regulations regarding quotas on the incidental harvesting of sea lions during commercial fishing operations; other natural or human incidences such as shooting adult sea lions at rookeries, haulout sites, and in the water near boats. None of these factors are regulated by or within the jurisdiction of the Forest Service.

Southeast Alaska populations of Steller sea lions have not declined to the extent that other populations have. Harassment or displacement of sea lions from preferred habitats by human activities such as boating, recreation, aircraft, log transfer facilities, log raft towing, etc., is a concern with regard to long-term conservation of the sea lion in Southeast Alaska. Forest-wide standards and guidelines direct the Forest Service to prevent and/or reduce potential harassment of sea lions and other marine mammals due to activities carried out by or under the jurisdiction of the Forest Service, and these have been incorporated by reference into the CPOW FEIS from the Supplement DEIS Tongass Land Management Plan. These Forest-wide standards and guidelines are as follows:

Provide for the protection and maintenance of harbor seal, Steller sea lion, and sea otter habitats.

1. Ensure that Forest Service permitted or approved activities are conducted in a manner consistent with the Marine Mammal Protection Act and the Endangered Species Act. "Taking" of marine mammals is prohibited; taking includes harassment, pursuit, or attempting any such activity.
2. Locate facilities and concentrated human activities requiring Forest Service approval as far from known marine mammal haulouts, rookeries and known concentration areas as practicable. The following distances are provided as general guidelines for maintaining habitats and reducing human disturbance:
    * Facilities, camps, LTF's, campgrounds and other developments should be located 1 mile from known haulouts, and farther if the development is large.

- * For aircraft flights on Forest Service approved projects, when weather ceilings permit, maintain a constant flight direction and airspeed and a minimum flight elevation of 1,000 feet (305 meters) within .5 miles (800 meters) of the haulouts.
- * For boat traffic on Forest Service approved projects, remain at least .5 miles (800 meters) away from hauled-out harbor seals during the pupping and rearing season (15 May - 1 July). Minimize disturbance of seals with pups in the water by remaining at least 330 feet (100 meters) away from parturient seals. (*Note:* These distances are derived from a study in a park where hunting is prohibited and access is restricted and where viewing seals is encouraged. These distances may be too liberal and may need to be enlarged in situations where access and hunting are not controlled and where seals would be expected to be more reactive to boat traffic.)
- * Minimize disturbance effects of boat traffic: for molting harbor seals, remain .5 miles (800 meters) away from haulouts where seals are molting; for Steller sea lions, remain at least .5 miles (800 meters) away from haulouts and rookeries; for sea otters, avoid known feeding and resting concentration areas, especially following prolonged stormy periods when sea otters have been unable to feed.
- * Individuals associated with Forest Service permitted or approved activities will not intentionally approach within 100 yards, or otherwise intentionally disturb or displace any hauled-out marine mammal.

3. Cooperate with State and other Federal agencies to develop sites and opportunities for the safe viewing and observation of marine mammals by the public. Maintain a public education program explaining Forest management activities related to marine mammals in cooperation with State and other Federal agencies.

No direct effects on sea lions from Forest management activities are anticipated. Forest-wide standards and guidelines have been developed (U.S.D.A. Forest Service 1991b) and adopted in the CPOW DEIS to prevent and/or reduce indirect effects of harassment or displacement due to Forest management activities. Compliance with those standards and guidelines will result in no adverse effects on sea lion populations or their habitats are anticipated with any of the alternatives.

AMERICAN PEREGRINE FALCON (*Falco peregrinus anatum*)

Distribution and Population

The American peregrine falcon is primarily associated with interior Alaska for breeding, nesting and rearing of young. The falcon is highly migratory, wintering as far south as northern Argentina and occurring in Southeast Alaska only during migration periods (Ambrose, et al., 1988). Reproduction has increased population numbers three-fold in Alaska (ADF&G letter Feb. 6, 1987, Ambrose, et al., 1988, minutes of Interagency Wildlife Technical Committee Meeting of March 29, 1991). The USFWS is considering removing the species from the endangered list.

Effects of CPOW Proposed Action on Population or Habitat

The American and arctic peregrine falcons occur in Southeast Alaska only during migration. The primary reason for past declines in peregrine falcon populations was the proliferation of organochlorine pesticides, especially DDT and its principal metabolite DDE (Ratcliff 1969; Peskall 1976; Cade et al. 1971; Peskall and Kiff 1979; USFWS 1982). No organochlorine pesticides are authorized for use on the Tongass National Forest.

During migration through Southeast Alaska, the availability and abundance of prey species will most likely be the primary habitat factor affecting peregrine falcons. In coastal areas of Washington, the primary prey species for peregrine falcons were shorebirds and waterfowl species; passerine birds were also identified in the diet (Anderson and Debruyn 1979; Anderson et al. 1980). It is assumed that food sources would be similar for coastal Alaska.

Peregrines forage over open sites such as over bodies of water, marshes, grasslands, and shorelines, as well as above wooded areas. Peregrines attack flying prey from above or by chasing them. Although they forage over wide areas, they also have preferred foraging sites (White 1974).

Actual migration routes and patterns, and foraging areas, have not been identified for these two subspecies of peregrines in Southeast Alaska, but could include large water bodies in and around the CPOW Project Area. Forest-wide standards and guidelines have been developed for protecting seabird rookeries and waterfowl concentration areas (pages 4-102 to 4-104 in U.S.D.A. Forest Service 1991b) and have been adopted by the CPOW DEIS. A wide variety of passerine (perching and song) birds will be available from numerous open and forested communities under all alternatives associated with the CPOW Project.

No adverse effects on American and Arctic peregrine falcon populations or their habitats are anticipated with any Forest management activities under any of the alternatives. Population numbers of both the American and Arctic peregrine falcon populations are continuing to increase (ADF&G letter dated February 6, 1987; Ambrose et al. 1988). No harvest units for any of the alternatives are within two miles of any known nest sites of Peale's peregrine falcon.

ARCTIC PEREGRINE FALCON (*Falco peregrinus tundris*)

Distribution and Population

The Arctic peregrine falcon is primarily associated with the area north of the Brooks Range and Seward Peninsula; it is highly migratory, wintering as far south as northern Argentina (Ambrose et al. 1988). It occurs in Southeast Alaska only during migration periods. Reproduction has increased population numbers three-fold in Alaska (ADF&G letter Feb. 6, 1987; Ambrose et al. 1988; minutes of Interagency Wildlife Technical Committee Meeting of March 20, 1991). The USFWS is considering removing the species from the threatened list.

Effects of CPOW Proposed Action on Population or Habitat

See above, American Peregrine Falcon.

ALEUTIAN CANADA GOOSE (*Branta canadensis leucopareia*)

Distribution and Population

The breeding, nesting, and rearing of young Aleutian Canada geese is primarily associated with the Aleutian Islands. The Aleutian Canada goose winters in western Oregon, and in northwestern and central California. Although their movements within Alaska are not well known, the Aleutian Canada goose may occur in Southeast Alaska during migration. Population numbers in Alaska are increasing, and the USFWS is considering removing the species from the threatened list.

Effects of CPOW Proposed Action on Population or Habitat

The Aleutian Canada goose is not primarily associated with Southeast Alaska. Although migration patterns in Alaska are not well known, Aleutian Canada geese may occur in Southeast Alaska as migrants. Due to the limited use of the Project Area by Aleutian Canada geese, no adverse effects on their population by any of the alternatives is anticipated.

ESKIMO CURLEW (*Numenius borealis*)

Distribution and Population

The Eskimo curlew is primarily associated with western and northern Alaska. The Eskimo curlew is rare and not typically found in Southeast Alaska, but it may occur as a migrant.

Effects of CPOW Proposed Action on Population or Habitat

Due to the limited use of the Project Area by the Eskimo curlew, no adverse effects on their population by any of the alternatives is anticipated.

MARBLED MURRELET (*Brachyramphus marmoratum*)

The marbled murrelet is a small seabird that belongs to the family Alcidae. It is found throughout the North Pacific, the Asia subspecies (*B. m. perdix*) ranges from the Sea of Okhotsk, Kamchatka and Commander Islands, south to Korea, Japan and Kurile Islands. The North American subspecies (*B. m. marmoratus*) ranges from the Aleutian Archipeligo in Alaska, eastward to Cook Inlet, Kodiak Island, Kenai Peninsula, and Prince William Sound, southward coastally throughout the Alexander Archipelago of Alaska and through British Columbia, Washington, Oregon to central California, with individuals wintering as far south as southern California (Marshall 1988, USFWS 1992).

The species feeds below the water's surface on small fish and invertebrates in near-shore marine waters (Marshall 1988, USFWS 1992).

Marbled murrelets nest on land or in trees and lay only one egg. They are semi-colonial in their nesting habitats; nesting marbled murrelets are often aggregated (USFWS 1992). Alaska is the only state where marbled murrelets are known to nest on the ground in treeless areas. Five ground nests have been identified with certainty, based on sightings of the incubating bird (Mendenhall 1992). Twenty-three tree nests have been located in North America (16 in Oregon, Washington and California; 2 in British Columbia and 5 in Alaska). All 16 nests found in Washington, Oregon and California were located in old-growth trees that ranged in diameter at breast height from 35 inches to 210 inches. Nests were located high above the ground and usually had good overhead protection (USFWS 1992). Both males and females incubate marbled murrelet eggs; one bird stays at the nest for 24 hours, while the other is feeding on the ocean. After hatching their young, the adults stay at the nest with the young bird for only about four days. After that, the young bird is left alone in the nest, except when the adults return to the nest to feed it (Interagency Meeting Records June 12, 1989).

Except for the fall period when they are molting, flightless, and stay on the ocean, birds have been known to fly to tree stands every month of the year. In Washington, birds have been recorded up to 50 miles inland (Hamer and Cummins 1991, in USFWS 1992).

Overview of work in Alaska. There is a current upland study of marbled murrelets on Naked Island in Prince William Sound. In the study area, murrelets flew most frequently into two areas with steep slopes facing west, and 70-80% cover of hemlock old-growth. A cursory review of the small sample suggested greater murrelet use of inland areas at the heads of bays as opposed to the outer peninsulas. Slopes facing northeast, west or southwest may have greater use than slopes facing north, northeast or southeast on Naked Island (Kuletz 1991).

A cooperative pilot study/survey between the Forest Service and the USFWS began in the summer of 1991, to evaluate possible at-sea survey techniques. Data from this study will be used to develop a statistically valid sampling design for a region-wide inventory to ascertain abundance and distribution of marbled murrelets in Southeast Alaska. This work will continue in 1993 and will include studies to evaluate factors which affect daily and seasonal distributions of murrelets.

Marbled murrelets are common along the coast of the Project Area. Boat transect surveys were conducted along the shoreline of logged and unlogged areas by the Craig and Misty Fiords Ranger Districts in 1991; these surveys counted 7.5 and 10 marbled murrelets per kilometer traveled parallel to the shoreline in transects 200 meters wide. Assuming that marbled murrelets along the CPOW coast nest within the CPOW Project Area, and assuming a conservative estimate of seven marbled murrelets per kilometer of shoreline for the CPOW Project Area, then CPOW (361 km of shoreline) might provide habitat for 2,500 marbled murrelets. This figure is likely low, because the Craig and Misty survey figures were for 200 meter wide transects, not for all distances out from the shoreline. The estimate for CPOW assumes that the figure from the Craig vicinity can be extrapolated to CPOW and that birds nest in the general vicinity of where they are seen at sea.

In 1984 during a marbled murrelet research project conducted by the ADF&G, a tree nest was found on Baranof Island. This nest was on a large horizontal limb, 82 feet up in a mountain hemlock tree. In 1989, two more tree nests were found in California. Both nests were in large Douglas-fir trees, on large horizontal limbs, and were watched 24 hours a day. A newly hatched bird at one of these nests was carried off by a raven (Interagency Meeting Records, June 12, 1989). Thorne Bay Ranger District personnel collected data on a nesting stand on Prince of Wales Island in 1990. A marbled murrelet nest with egg shell fragments was discovered and photographed on the east ridge of 12-Mile Arm (Craig Ranger District, Prince of Wales Island), August 19, 1992. Egg shell fragments were found on the ground at two other locations; west ridge 12-Mile Arm and Old-Franks (Craig Ranger District, Prince of Wales Island), but nests were not located. A nestling marbled murrelet was found on the road at the east end of Neck Lake (northern part of the Project Area), and another young marbled murrelet was seen on the ground north of El Capitan (north of the Project Area).

Old growth removal is not the only factor which may be influencing murrelet populations; other known factors include oil spills, predation, and commercial fishing (murrelets are caught in fishing nets). Mendenhall (1992) estimated the marbled murrelet population for Southeast Alaska ranged from 75,000 to 150,000 during the summer, based on surveys by M. McAllister from 1981-1988.

Effects of CPOW Proposed Action on Population or Habitat

No nesting sites for marbled murrelets have been identified within the Project Area, although it is assumed that they nest in suitable habitats.

Since all inland forest stands on the Tongass National Forest are less than 25 miles from salt water, all could be potential marbled murrelet nesting habitat (USDI Fish and Wildlife Service 1992). However, these birds more commonly occupy larger stands (greater than 500 acres) than smaller stands (less than 100 acres) in California; marbled murrelets are usually absent from stands less than 60 acres in size (Paton and Ralph 1988, Ralph et al. 1990). Without precise knowledge to delineate the differences, all old-growth habitat greater than 8 MBF/acre is assumed to be suitable for nesting.

All action alternatives will harvest stands which may be capable of providing nesting habitat (old-growth forests) for marbled murrelets. Table 3 shows that alternatives 2, 4, and 5 harvest seven percent and Alternative 3 harvests eight percent of the old-growth habitat in the Project Area, leaving at least 122,500 acres of old-growth unharvested.

In areas with timber harvesting, the amount of nesting habitat for marbled murrelets will be reduced. The amount of old-growth currently being used by marbled murrelets is unknown. The factors currently limiting marbled murrelets in Southeast Alaska have not been identified. Due to the amount of unknowns associated with marbled murrelets, it is not known what the actuals effects of timber harvest will be, other than the total amount of habitat is reduced.

If the current population assumptions found in the Distribution and Population section are correct, and if it is assumed that nesting habitat is the limiting factor for the population, then a reduction in nesting habitat may have a proportional effect on the population. If so, then even after a seven to eight percent reduction in potential nesting habitat (Table 2), the CPOW Project Area may still support 2,300 or more birds. This assumes no influence caused by fragmentation or increased edge, and a uniform use of the available, suitable habitat.

In summary, the CPOW Project may effect marbled murrelets, but the extent of this effect is unknown.

Table 2
Acres and Percent of Wildlife Habitats Proposed for Harvest, by Alternative

		Alt. 1		Alt. 1a		Alt. 2		Alt. 3		Alt. 4		Alt. 5	
Habitat	Existing Acres	Acres Cut	% Chg	Acres Cut	% Chg	Acres Cut	% Chg	Acres Cut	% Chg	Acres Cut	% Chg	Acres Cut	% Chg
Old Growth	132,753	0	0	0	0	9,764	7	10,210	8	9,137	7	9,632	7
Alpine/subalp.	11,214	0	0	0	0	31	<1	35	<1	0	0	40	<1

SOURCE: Matson 1992. Data derived from GIS data base.

Murrelet nests are exceedingly difficult to find, and no intensive nest searches in CPOW units are planned. However, if any nests are discovered, they will be protected by a minimum 600 foot buffer around the nest tree as proposed in the CPOW FEIS. If reseach, monitoring,or administrative studies uncover new information addressing murrelets in Southeast Alaska, they will be reviewed for use in and/or replacement of this guideline. Draft 1991 Interim Management Guidelines For Marbled Murrelet Habitat Conservation in Washington, Oregon and California (where the marbled murrelet is listed as Threatened) calls for maintaining all contiguous suitable habitat in stands less than 480 acres where murrelet occupancy during the breeding season is demonstrated.

NORTHERN GOSHAWK (*Accipiter gentilis laingi*)

Distribution and Population

The American Ornithologists Union (AOU) recognizes two subspecies of the northern goshawk, *Accipiter gentilis atricapillus* and *A.g. laingi*, the Queen Charlotte goshawk (AOU 1957). Taverner (1940) first described the darker plumaged Queen Charlotte goshawk as a distinct race occurring in the coastal temperate rainforests of the Queen Charlotte Islands and Vancouver Island, British Columbia. Webster (1988) found that the Queen Charlotte goshawk occurred from Vancouver Island north to the Taku River near Juneau.

As of December, 1991, the Alaska Region Status Report for USDA Region 10 Sensitive Species Consideration, stated, "The two factors causing concern for the goshawk in southeast Alaska are: low current population numbers and potential declines in habitat capability. Both factors expose the Queen Charlotte Goshawk to increased susceptibility to local or widespread extirpation. A review of goshawk observations during the past decade has revealed 16 confirmed or probable nesting sites in southeast Alaska." There was a high association between goshawk nesting stands and higher volume/tree size stands: 8 (50%) of the 16 sites were clearcut or planned for timber harvest until the goshawk nests were found (Iverson unpubl. rep.)", and this relationship has been established in other parts of it's range. However, no systematic Regional inventories have been conducted to confirm the relationship between nesting stands and higher volume tree stands in southeast Alaska.

The goshawk is a wide-ranging forest raptor that generally occurs in low densities, from 2.4 pair (Central Alaska, McGowan 1975) to 11.0 pair (Arizona, Crocker-Bedford and Chaney 1988) per 100 square kilometers, although population densities in Southeast Alaska may be much lower (Crocker-Bedford 1992). Home ranges have been reported to be 5,000 to 6,000 acres (Reynolds 1983). These home ranges may include a mosaic of habitat types, with a strong preference for mature forest with flight space beneath the canopy (Reynolds 1989, USDA Forest Service 1990). Home range size is strongly dependent upon quality of the foraging habitat and prey availability (Kenward 1982).

Goshawks generally select forest stands with large trees on gentle slopes at lower elevations for nesting and foraging (Reynolds 1989, USDA Forest Service 1990). Goshawk sensitivity to timber harvest has resulted in management recommendations to protect nest site integrity (Reynolds et al. 1982, Reynolds 1983, Crocker-Bedford and Chaney 1988, Fowler 1988, Kennedy 1988, USDA Forest Service 1990, USDA Forest Service 1991, USDA Forest Service Alaska Region 1992). Other management recommendations recognized the importance of the foraging area within the post-fledging area (Woodbridge et al. 1988, Kennedy 1989, Crocker-Bedford 1990b, USDA Forest Service 1991, USF&W letter of Sept. 5, 1991, USF&W letter of Aug. 13, 1992, and USDA Forest Service Alaska Region 1992). There is now widespread recognition of the importance of most foraging habitat, including areas far from the nesting site (Reynolds and Meslew 1984, Reynolds 1989, McCarthy et. al 1989, USDA Forest Service 1990, Crocker-Bedford 1990b, Crocker-Bedford 1991, Hargis et al. 1991, Patla 1991, USF&W Service letter of Sept. 5, 1991, USF&W Service Letter of Aug. 13, 1992, Reynolds et al. 1991, Crocker-Bedford 1992, USDA Forest Service 1992, Ward et al. 1992, Marshall 1992).

There are two locales within the CPOW Project Area where goshawk nests have been confirmed: the Sarheen Goshawk Management Area, southwest of Neck Lake, and the Sarkar Lake Goshawk Management Area. The Sarheen Goshawk Management Area has 1 confirmed, 1 probable, and 2 possible nest sites; Sarkar Lake has one confirmed nest site. Goshawks typically alternate between three nests in different years (Crocker-Bedford 1990b).

All four birds (two adults and two juveniles) in the Sarkar Lake Goshawk Management Area have been fitted with radio transmitters. These birds are being studied by biologists from the Alaska Department of Fish and Game (ADF&G) to better understand the habitat requirements of goshawks in Southeast Alaska. Preliminary findings (Flatten/Lowell, ADF&G, Pers. Comm. 1992) of this study reveal:

Almost all relocations have been in Volume Class 4+ (greater than 8 MBF/acre) old growth.

- Birds often flew into Sea Otter Sound, 5-7 miles northwest, west, and southwest of the nest; and to Whale Pass-Ragged Cove vicinity, 11-16 miles north/northeast of the nest. An adult male spent the second half of August near Salt Lake Bay, 19-22 miles south of the nest; and an adult female spent the last 3 weeks of August, 30-40 miles northeast of the nest on theeast side of Zarembo Island.

Habitat composition has been analyzed and mapped for both Goshawk Management Areas (Foraging Area, including all Nesting Areas and the Post Fledging Area) and is shown in Table 3.

Table 3
Habitat Composition of Goshawk Management Areas, in Acres, For the CPOW Project Area.

Name	Size (Acres)	Non-Forest (Acres)	Low Productivity (Acres)	Fresh Water (Acres)	Clearcut (Acres)	Volume Class 4+ (Acres)
Sarheen	7,632	159	2,657	189	1,353	3,274
Sarkar Lake*	3,867	20	164	54	1,927	1,702

* The Sarkar Lake Goshawk Management Area is analyzed only for the portion that is in the CPOW Project Area. The mapped Foraging Area includes parts of Tuxekan and El Capitan Islands.

Adult goshawks have been observed during the breeding season in the Hatchery Creek area, Eagle Creek/ Coffman Creek area, and east of Staney Creek.

In 1991 the Ketchikan Area awarded a Sikes Act Contract to the ADF&G to inventory and study goshawks. More than 85,000 acres between Neck Lake and the Craig/Hollis road were searched in 1992 for goshawks. This contract surveyed the following units in the CPOW unit pool: 549.2-201, 549.2-205, 549.2-206, 549.2-207, 549.2-230, 550-214, 550-215, 550-227, 550-228, 550-230, 550-237, 550-238, 550-239, 552-259, 552-270, 554.2-200, 554.2-201, 554.2-206, 554.2-210, 554.2-213, 554.2-214, 554.2-215, 554.2-220, 554.2-225, 557-201, 557-202, 571-225, 571-226, 571-227, 571-235, 571-252, 571-253, 571-256, 571-257, 571-258, 571-260, 571-265, 571-266, 571-267, 571-268, 573-225, 573-259, 573-270, 573-296, 574-204, 574-210, 574-238, 577-316, 588-257, 588-262, and 588-263.

During 1992, Forest Service biologists spent 24 biologist days searching for other goshawk nest sites within the three known goshawk locales. Biologists searched 23 potential units of CPOW (549.2-201, 549.2-205, 549.2-206, 549.2-207, 549.2-230, 550-206, 550-208, 550-209, 550-211, 550-227, 550-228, 550-230, 574-210, 574-224, 574-238, 574-239, 577-200, 577-201, 577-202, 577-204, 577-205/205B, and 577-320) and four previously approved units of KPC 1989/94 Long-term Sale (550-111, 550-114, 550-117, and 583-104). A red-tailed hawk, great blue herons, and a pair of sharp-shinned hawks were discovered, but not within or near CPOW units. Forest Service archeologists chanced upon a pair of goshawks displaying nest defense behavior within a CPOW unit of Alternative 3 and 4, one mile from the previously confirmed Sarheen nest site (which was not occupied in 1992).

In 1991, ADF&G and Forest Service biologists detected one adult with two fledglings during 48 biologist days of effort over 31,000 acres in CPOW Project Area (Gustafson 1991). Although the 1991 survey was not intended to emphasize possible CPOW units, the survey did include the following units of the unit pool: 549.2-214, 549.2-215, 549.2-217, 549.2-218, 549.2-220, 550-200, 572-214, 572-215, 572-216, 572-217, 573-252, 573-253, 574-200, 574-201, 574-202, 574-203, 574-204, 574-205, 574-210, 574-220, 547-221,

574-222, 576-200, 576-201, 576-202, 576-213, 576-214, 577-204, 578-203, 578-204, 578-221, 578-222, 578-223, 578-224, 579-210, 579-211, 579-221, 581-219, 581-228, 581-229, 583-227, 586-200, 586-223, 586-224, 586-225. Although the inventory techniques were among the best available, there is a high likelihood that nests were missed even in the stands that were sampled (Kimmel, J. T. and R. H. Yahner 1990; Kennedy et al., in press; and ADF&G 1992 Goshawk Survey Progress Report). Any pairs of goshawks missed to date will not be protected unless chance observations are made during the timber sale layout process.

0n August 18, 1992, the Alaska Region issued Interim Management Guidelines for the goshawk on the Tongass National Forest, and these guidelines were met in all alternatives. A review and evaluation of the guidelines will occur. All units laid out for the Final EIS will follow the management guidelines for goshawks in effect at the time of layout.

Effects of CPOW Proposed Action on Population or Habitat

None of the alternatives proposes timber harvest of known nest areas (30 acres around nest in the Interim Guidelines). Alternatives 3 and 4 propose harvest of part of one probable nest area, which was reported after the CPOW alternatives were developed (if the nest area is confirmed, this unit will be dropped or modified to be be consistent with Interim Guidelines). No alternatives propose harvest within the post fledging areas (PFA in Interim Guidelines).

Table 4 presents acres of proposed timber harvest within the mapped Goshawk Foraging Areas, which the reader may wish to compare to Table 2 (existing habitat condition).

Table 4
Acres of Timber Harvest Within Mapped Goshawk Foraging Areas.

Foraging Area	Alt. 1	Alt.1a	Alt. 2	Alt. 3	Alt. 4	Alt. 5
Sarheen	0	0	0	336	335	331
Sarkar Lake	0	0	219	0	219	162

There is now widespread recognition that the foraging area, even portions far from the nest site, may be important. Timber harvest sometimes has the potential to degrade foraging habitat (Reynolds and Meslew 1984, Reynolds 1989, McCarthy et al. 1989, USDA Forest Service 1990, Crocker-Bedford 1990b, Crocker-Bedford 1991, Hargis et al. 1991, Patla 1991, USF&W Service letter of Sept. 5 1991, Reynolds et al. 1991, Crocker-Bedford 1992, USDA Forest Service 1992, Ward et al. 1992, Marshall 1992, USF&W letter of Aug. 13, 1992). Therefore, there is a possibility that the productivity of known goshawks will be affected because of timber harvest proposed in Alternatives 2, 3, 4, and 5 within the goshawk foraging areas (see Tables 2 and 4). The amount of acres proposed for harvest within the goshawk management areas increases from Alternative 2 (219 acres) to Alternative 3 (336 acres) to Alternative 5 (393 acres) to Alternative 4 (554 acres). Where larger amounts of past clearcutting has occurred (Table 2) within the goshawk management areas, additional

harvest may have more effect on goshawk productivity due to increased fragmentation and edge resulting in less favorable foraging habitat and increased competition from other raptors.

Any pairs of goshawks not discovered prior to timber harvest may be affected if the harvest unit corresponds to key stands of habitat. Any goshawk nest found prior to harvest will be protected utilizing the current goshawk management guidelines. Therefore, the CPOW Project may effect northern goshawks.

HARLEQUIN DUCK (*Histrionicus histrionicus*)

Distribution and Population

The harlequin duck's range is divided into two separate and distinct regions: eastern and western. The eastern range embraces Iceland, parts of Greenland, and Labrador, with the winter range extending as far south as New Jersey. The western range includes northeast Siberia west to the Lena River, east to the Kamchatka Peninsula and the Commander Islands and north to the Arctic Circle, then across the Bering Sea to the Aleutian Islands, much of interior Alaska, and south to northwest Wyoming and central California (Bellrose 1976). For Alaska, the harlequin duck has been reported as a fairly common year-round resident, and at one season or another, has been recorded over much of the State, except the Arctic coast (Gabrielson and Lincoln 1959).

Available evidence indicates that the species breeds locally over much of southern Alaska, probably the Aleutians, and north to Anaktuvuk Pass. All ornithologists who have worked during the spring and summer months in the Alexander Archipelago and other parts of Southeast Alaska, have commented upon the numbers of these ducks, frequently summarizing their observations by stating that they were common or abundant (Gabrielson and Lincoln 1959).

Harlequins nest along inland rivers and streams. Usually the nest site is within 6 feet (but up to 60 feet) of water (DeGraaf et al. 1991). The site chosen usually has shelter overhead - a recess in a stream bank, or among rocks, or under shrubs, trees, or stranded debris. Occasionally the nest is in an open area, but under shrubbery of other low vegetation, or even on a stream bar. There is no proof that harlequins nest in tree cavities (Bellrose 1976; Armstong et al. 1983; Kortright 1962; Godfrey 1979; Palmer 1975). During the winter the harlequin duck is common to abundant in the coastal waters of Southeast Alaska, Prince William Sound, Cook Inlet, the bays of the Alaska Peninsula, the Aleutians and the Pribilofs (Gabrielson and Lincoln 1959). Preferred winter habitat is reported to be areas along surf-pounded rocky coasts -- not in sheltered bays and fjords, but instead where water is one to two fathoms deep and turbulent, and where bottom fauna abounds (Palmer 1975).

Effects on Population or Habitat

Nesting habitat for the harlequin duck occurs along inland rivers and streams. Riparian habitats along all rivers and streams on the Forest will be managed according to the Stream and Lake Protection management prescription or a more restrictive management prescription (such as when a stream or river is in a Wilderness Area). The Stream and Lake Protection Management Prescription is on pages 3-180 to 3-205 of the TLMP Revision SDEIS Proposed Revised Forest Plan and have been adopted by the CPOW Project. Nesting habitat requirements are expected to be maintained and since winter habitat occurs in the marine environment, in

areas of high surf and rocky beaches, no effect on harlequin ducks is anticipated with any alternatives of the CPOW Project.

SPOTTED FROG (*Rana pretiosa*)

Distribution and Population

The spotted frog occurs in or near fresh water and is believed to range south from the Taku river, other transboundary rivers and some islands of Southeast Alaska and British Columbia (Holmberg, April 17, 1992). Spotted frogs have been documented in the Stikine River basin (Waters 1992). Presence of spotted frogs on Prince of Wales Island has not been confirmed. Two unconfirmed sightings were reported, one in Polk Inlet and the other in south Prince of Wales, but upon further investigations, have been changed to wood frog observations.

Effects of CPOW Proposed Action on Population or Habitat

Riparian habitats along all lakes, rivers and streams on the Forest will be managed according to the Stream and Lake Protection management prescription or a more restrictive management prescription (such a when a stream or river is in a Wilderness Area). The Stream and Lake Protection Management Prescription is on pages 3-180 to 3-205 of the TLMP Revision SDEIS Proposed Revised Forest Plan and have been adopted by the CPOW Project. With the implementation of Stream and Lake Management Prescriptions, no effect on the spotted frog is anticipated by the CPOW Project, even if they are found to occur within the Project Area.

PRINCE OF WALES FLYING SQUIRREL (*Glaucomys sabrinus griseifrons*)

Distribution and Population

The Prince of Wales flying squirrel is unique to Prince of Wales Island. Howell described the flying squirrel as unknown and "scarce on the Island" (Howell 1934). In contrast to Howell's 1934 account, results from a survey of local trappers indicated that it is present in substantial numbers and is distributed across at least the northern third of the island (USFWS Memorandum, June 5, 1987).

Fay (1985) suggested a taxonomic re-evaluation is needed for the Prince of Wales flying squirrel.

The home range of flying squirrels is about 1.6 hectares (about 4 acres). Population densities range from two to five per hectare. Flying squirrels usually have one litter of young per year, with a litter size ranging from one to six. Their habitat includes a forest mosaic which provides adequate denning sites and feeding areas. Denning sites include tree cavities and "witches brooms." Forage includes fungi, berries, and lichens (Interagency Task Group meeting records, July 18, Sept. 1 and 8, 1988).

Noble and Harrington (1978) examined the density of snags in the mature forest on Prince of Wales Island and found that snags were present at densities up to 60 per acre -- far in excess of flying squirrel habitat requirements (USFWS Memorandum, June 5, 1987; Interagency Task Group meeting records, July 18, Sept. 1 and 8, 1988).

The flying squirrel is a species which shows a habitat use relationship with the size of its preferred habitats (July 31 and August 1, 1989 interagency workshop). Optimum use occurs when patches of preferred habitat are greater than 300 acres, and use declines with decreasing patch size; it becomes zero when patches are smaller than 25 acres.

In a June 5, 1987, memorandum, the U.S. Fish and Wildlife Service recommended changing the Prince of Wales flying squirrel from a Category 2 candidate species to a Category 3 candidate species. In making this recommendation, the USFWS provided the following information on the Prince of Wales flying squirrel:

> "The squirrel is known to be largely dependent on old-growth forest for both nesting and foraging habitat. Current estimates of old growth harvesting on Prince of Wales Island indicate that enough old growth will remain for populations of flying squirrels. Noble and Harrington (1978) examined the density of snags in the mature forest on Prince of Wales Island and found that snags were present at densities up to 60 per acre -- far in excess of flying squirrel habitat requirements. The squirrel is also apparently coexisting in healthy numbers with introduced marten on the island."
>
> An Interagency Task Group evaluated the habitat requirements for flying squirrels and determined that habitat necessary to maintain viable populations would be available on Prince of Wales Island (ref.: Interagency Task Group meeting records, July 18, Sept. 1 and 8, 1988).

Prince of Wales Island is within two ecological provinces: North Prince of Wales (#14) and Southern Prince of Wales (#18). The TLMP SDEIS displays the amount of old growth within these provinces in designated Wilderness and Legislated LUD II areas (TLMP Revision SDEIS, page 3-309). Reported densities of flying squirrels range from 2 to 5 per hectare (.8 to 2 per acre). The Wilderness Areas and Legislated LUD II Areas on Prince of Wales Island are estimated to provide habitat capability ranging 83,000 to 208,000 squirrels (low range based on .8 squirrels per acre for all productive old growth; high range based on 2 squirrels per acre for all productive old growth).

In addition to the Wilderness Areas and Legislated LUD II Areas, the riparian areas will be managed according to the Stream and Lake Protection Management Prescription. There will also be both productive and unproductive old growth in various patch sizes between these areas. Forest-wide biological diversity standards and guidelines for old growth and forest-wide snag/cavity nesting standards and guidelines will maintain important habitat components for flying squirrels (U.S.D.A. Forest Service 1991b, pages 4-3 to 4-7, and 4-104 to 4-105) and have been adopted by the CPOW Project.

Effects of CPOW Proposed Action on Population or Habitat

Since timber harvest will be removing and fragmenting flying squirrel habitat, the CPOW Project may effect the Prince of Wales flying squirrel.

CANDIDATE (Category 2) PLANT SPECIES

Aster yukonensis

This taxon is known from an area near Bettles, north of the Yukon River, and from the north side (continental side) of the St. Elias Range, north of Yakutat (Murray and Lipkin 1987). The plant would not be expected to occur in the Project Area (Demeo 1992).

Since this species is not known to occur in the Project Area, there are no anticipated effects of the CPOW proposed action on population or habitat of *Aster yukonensis* (DeMeo 1992).

Calamagrostis crassiglumis

Disjunct populations of this grass are known along the Pacific coast from Kodiak Island south to northern California. The plant grows in marshy wet areas, muddy areas near lakes, beach meadows, and rocky soil. This plant does not grow in muskeg habitats (Muller 1991). Based on collections in Alaska and British Columbia, the plant may be found in the Project Area.

This species is not known to occur in forested areas; therefore, no direct effects from timber harvest are anticipated. Changes in drainage due to roading or other activities may affect habitat and populations of the plant (DeMeo 1992). Stream, estuary, and lakeshore buffers should provide adequate protection for this plant.

Carex lenticularis var. dolia

This sedge is known to be in the coastal mountains of southern Alaska and may be expected to occur in the Project Area (DeMeo 1992).

This species is not known to occur in forested areas; therefore, there are no effects anticipated from timber harvest (DeMeo 1992).

Montia bostockii

This small herb occurs in alpine and subalpine meadows in the Brooks Range through the Wrangell-St. Elias Range (Muller 1991). It would not be expected to occur in the Project Area.

Since *Montia bostockii* is not known to occur in the Project Area, there are no effects anticipated from CPOW timber harvest activities (DeMeo 1992).

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DOCUMENTATION OF CORRESPONDENCE WITH OTHER AGENCIES

June 5, 1987:	U.S. Fish and Wildlife Service memorandum, recommended changing the Prince of Wales flying squirrel from a Category 2 candidate species to a Category 3c candidate species.
Dec. 4, 1990:	NMFS publishes final rule in the Federal Register listing the Steller sea lion as a threatened species.
March 20, 1991:	Interagency Wildlife Technical Committee Meeting.
April 2-4, 1991:	Marbled murrelet workshop sponsored by the USFWS.
Sept. 5, 1991:	USF&W letter critique of USDA Forest Service Region 3 Management Guidelines for the Nothern Goshawk in the Southwestern Region, (56 FR 122, 28853).
Dec. 17, 1991:	Status report on R10 sensitive species canadates.
Jan. 28, 1992:	Forest Service letter to NMFS requesting list of T & E species in proposed project areas.
Feb. 6, 1992:	NMFS letter listing humpback whale and Steller sea lion as being within the central Prince of Wales project area.
March 5, 1992:	Letter from USFWS concerning T & E in Lab Bay, Prince of Wales, Polk and Revilla timber sale areas.
April 8, 1992:	Phone conversation with NMFS about the status of recovery plans for whales and the Steller sea lion, and proposed regulations for approaching marine mammals.
April 8, 1992:	Letter to USFWS requesting updated list of T & E and proposed and candidate species.
April 9, 1992:	Phone conversation with the Alaska Natural Heritage Program to check on any changes in the listing of candidate plants.
April 15, 1992:	Letter from USFWS updating the list of threatened, endangered, and candidate species likely to occur on the Forest.
April 17, 1992:	Phone conversation with the USFWS clarifying that the Aleutian Canada goose is not likely to occur on the Forest.
June 24, 1992:	USDA Forest Service memo describing current status of goshawk call survey.
Aug. 13, 1992:	USF&W letter critique of USDA Forest Service Region 3 Management Guideline Revision for the Northern Goshawk in the Southwestern Region, (57 FR 119, 27424).
Aug. 18, 1992:	Interim habitat recommendations for the northern goshawk, USDA Forest Service, Alaska Region, Juneau.

Dave Arrasmith

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
P.O. Box 21668
Juneau, Alaska 99802-1668

March 18, 1993

RECEIVED
FOREST SUPERVISORS OFFICE
3/22/93
TONGASS NF
KETCHIKAN, AK 99901

David D. Rittenhouse
Forest Supervisor, Ketchikan Area
Tongass National Forest
USDA Forest Service
Federal Building
Ketchikan, Alaska 99833

Dear Mr. Rittenhouse:

Thank you for your recent letter containing the Biological Assessment (BA) for the Central Prince of Wales Timber Sale. The BA evaluates the potential for effects to humpback whales and Steller sea lions as a result of harvesting timber, constructing roads, and use of five existing log transfer facilities. You have determined that the proposed actions, mitigated by the Tongass Forest Plan Revision Forest-wide Standards and Guidelines that limit vessel and aircraft proximity to marine mammals, are not likely to affect these listed species.

We concur with your conclusion that the proposed actions are not likely to affect endangered or threatened species within our purview. This concludes Section 7 consultation requirements for the Central Prince of Wales study area. If new information or circumstances arise that could cause us to alter this determination, consultation pursuant to Section 7 of the ESA should be reinitiated. For further coordination regarding Section 7 consultation, contact Tamra Faris at (907) 586-7235.

Sincerely,

Ron Collinsworth

for Steven Pennoyer
Director, Alaska Region

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Fish and Wildlife Enhancement
Ecological Services Juneau
Southeast Alaska Ecological Services
P.O. Box 021287
Juneau, Alaska 99802-1287
(907) 586-7240

TAKE PRIDE IN AMERICA

IN REPLY REFER TO:

RECEIVED
FOREST SUPERVISORS OFFICE
2/14/93
TONGASS NF
KETCHIKAN, AK 99901

April 9, 1993

David D. Rittenhouse
Forest Supervisor
Ketchikan Area
Tongass National Forest
Federal Building
Ketchikan, AK 99901

Dear Mr. Rittenhouse:

The U.S. Fish and Wildlife Service (Service) has reviewed the March 9, 1993 biological assessment for threatened and endangered species that may occur in the Central Prince of Wales (CPOW) timber sale area. The assessment evaluated the effects of proposed actions on the following species:

Common Name	Scientific Name	ESA Status
American peregrine falcon	Falco peregrinus anatum	endangered
arctic peregrine falcon	Falco peregrinus tundris	threatened
Aleutian Canada goose	Branta canadensis leucopareia	threatened
eskimo curlew	Numenius borealis	endangered

Based on the analysis contained in the CPOW biological assessment, the Forest Service concluded that the proposed project will not affect listed species that may occur in the project area. For the purposes of Section 7 of the Endangered Species Act, we concur that the proposed project would not likely adversely affect currently listed threatened or endangered species. Accordingly, no incidental take is authorized.

The CPOW biological assessment also discussed potential effects on several Category 2 candidate species. We are very pleased that these species are addressed. Though not required by law, early discussion and interagency management cooperation is a valuable tool in the conservation of species. Unfortunately, in many cases, by the time sufficient information is available to warrant listing or preferred management practices are implemented, many options for population maintenance or recovery are no longer available, or are more costly. We congratulate you and your staff for your efforts in this document.

The following specific comments regarding Category 2 species are offered as technical assistance for your consideration.

Marbled murrelet - Prince of Wales Island is one of the most severely logged islands in southeast Alaska. Organisms dependent on mature and old growth forest, such as the marbled murrelet, will suffer the continued direct loss of habitat as a result of the CPOW timber sale. There will also be cumulative effects of the large scale timber harvest that has already occurred and adverse effects of increased edge and fragmentation. The CPOW project will likely adversely affect marbled murrelets.

The Forest Service must develop a management plan for marbled murrelets that will assure the maintenance of at least existing populations throughout the Tongass National Forest. Current programs are not adequate. At a minimum, increased efforts are needed to locate murrelet nests, study murrelet nesting ecology and use of forested areas throughout the year. The currently proposed 600 foot buffer around a discovered murrelet nest tree is not adequate. At a minimum, the Forest Service should adopt and apply in Alaska the up-to-date Management Guidelines for Marbled Murrelet Habitat Conservation in Washington, Oregon and California. We continue to view site/organism specific management programs as valuable for interim, stop gap, or as adjunct measures to ecosystem/landscape based management of natural systems.

We suggest that the Tongass National Forest work closely with the marbled murrelet recovery team, the Pacific Seabird Group and Fish and Wildlife Service to develop and implement management measures that assure protection of marbled murrelets in Alaska.

Northern goshawk - As stated in the CPOW biological assessment, northern goshawks prefer and are highly dependent on mature timber forest habitat. Continued large scale timber harvest on Prince of Wales Island has removed and fragmented large portions of available suitable habitat for this animal. The CPOW timber sale will likely adversely affect northern goshawks.

This office has previously provided comments to other areas and districts of the Tongass National Forest concerning northern goshawk management. We do not believe that the current interim guidelines are adequate to protect either a particular goshawk territory or a viable, well distributed goshawk population. For example, where current or historic goshawk nests have been documented, no cutting should be permitted within the nest area, post fledging area or foraging area. Even if adequately modified, site specific management efforts will likely fail to assure the maintenance of populations or population segments at the ecosystem level.

We appreciate the efforts that the Forest Service has made to fund and support northern goshawk studies in southeast Alaska, in cooperation with the Alaska Department of Fish and Game (ADF&G). We urge continuation of your funding of ADF&G field investigations.

Category 2 plants - We appreciate your review of Category 2 plants. We encourage increased efforts to improve base information, distribution, abundance and effects of development.

Although we have not addressed all Category 2 candidate species discussed in the CPOW biological assessment, we are equally concerned about each. We encourage you to continue to gather information and assess the effects of project development on candidate species that may occur in a project area. We urge you to implement management practices that will preclude the need to invoke the provisions of the Endangered Species Act, thus avoiding the crisis circumstances such as those that currently prevail in the Pacific Northwest. We believe this is an achievable objective, through the establishment of long term, large scale, ecosystem based management of all resources.

These comments are offered for endangered and threatened species for which the U.S. Fish and Wildlife Service has responsibility under Section 7 of the Endangered Species Act of 1973 (16 U.S.C. 1521 et seq.) and its amendments. The above comments are specific to the Endangered Species Act and do not reflect agency concerns regarding other organisms or habitats for which the Service has legislated responsibilities.

Sincerely,

Nevin D. Holmberg

Nevin D. Holmberg
Field Supervisor

cc: ADF&G, Douglas
NMFS, Juneau

APPENDIX C

Unit Design Criteria

Central Prince of Wales Final Environmental Impact Statement

UNIT DESIGN CRITERIA
for the Central Prince of Wales Final EIS

Overview

The CPOW IDT designed a multi-entry layout plan (MELP) to identify potential timber harvest units and associated roads within the CPOW Project Area. Units were designed to meet the standards and guidelines of the Forest Plan and be consistent with the standards adopted by the TLMP Draft Revision. This MELP was based on the previous logging and transportation plan, high resolution topographic maps, 1979 and 1991 aerial photos, available GIS information, and site-specific on-ground knowledge. This plan identified harvest unit boundaries, road locations, logging systems, and resource concerns for commercial forest land in the Project Area that met the standards and guidelines of the current Forest Plan as well as those of the TLMP Draft Revision Alt P, and that also met minimum economic criteria. Each unit was photo identified, mapped on large scale topographic maps, and passed through an interdisciplinary review.

After the initial identification of harvest unit boundaries, the MELP has been adjusted many times to incorporate recommendations from peer level reviews, as well as site-specific information from field surveys. During the FY92 field season, units proposed for harvest by the CPOW DEIS were intensively field reconned by a variety of resource specialists. The results of the recon were incorporated into the MELP. Currently, the MELP for the CPOW Project Area has identified 1,176 harvest units totalling 1.437 billion board feet.

Detailed chronology of MELP design

The inventory process started in November 1990. An IDT was convened with the following personnel:

IDT leader/timber planner
soil scientist/hydrologist
landscape architect/recreation planner
wildlife/fisheries biologist
systems analyst.

The initial premise behind the development of the inventory was to identify viable, minimally controversial harvest units which could provide timber volume for a large-scale EIS on Prince of Wales Island for the Long-Term Contract. Because the project area was loosely defined, the MELP included the LAB Bay and Control Lake project areas, as well as CPOW. This covered over 700,000 acres. As the Project Area became more tightly defined through the preliminary NEPA process, it became necessary to expand the scope of the inventory to include all suitable-available commercial forest land. This more expansive inventory analyzed harvest units in areas which were not considered in the initial inventory process, including the extended rotation and old-growth 'retention' areas delineated by the 1989-94 LTS EIS.

The general methodology used in the inventory process was to delineate areas which were not suitable for timber entry (see following table), then identify commercial forest land within the potentially loggable areas, and finally define individual, discrete harvest units which fully met the governing standards and guidelines.

Legally withdrawn

1. Private land
2. LUD I/Primitive recreation areas
3. Class I/II stream buffers (for simplicity, this has been expanded to include all Class II streams and not just those flowing into Class I streams)
4. Proposed harvest units for the long term sale or for independent offerings

Physically withdrawn

1. Non-timbered land
2. Lakes
3. Forested land, but less than volume class 4 as determined by the GIS TIMTYP layer
4. Second growth

Withdrawn by TLMP standards and guidelines

1. Shoreline buffer of 500 feet
2. 100-foot buffer around all freshwater lakes over 10 acres
3. Soil types identified as rock out croppings (SMU = 81), talus slopes (SMU = 22), and landslides (SMU = 15)
4. Encumbered lands (selected but not conveyed)
5. 1,000-foot buffer around estuaries
6. Eagle nest buffers

The initial phase of the inventory was the compilation of all the GIS data for areas withdrawn from harvest consideration. The reverse image of these deferred areas was then overlaid with the GIS TIMTYP layer to delineate commercial forest land which was suitable for harvest. This timber data was then combined with the roads and streams layer and plotted on a scale of one inch equals one thousand feet. These maps were overlayed with high-quality, topographic maps of a similar scale.

The timber planner started the second phase of the process by delineating the harvest units and associated roads, designating the logging system requirements, and assigning a unit number. Proposed units were transferred to aerial photos---a process which was facilitated because the photos also have a rough scale of one inch equals one thousand feet. When the 1991 aerial photos became available, the CPOW IDT switched to four inch to the mile topographic quads, because that was the scale of the new aerial photos.

During the logging/road design, roads were conservatively planned to improve the potential of getting the surveyed road fairly close to the planned location. Sustained grades were limited to less than 8 percent, except for short pitches that occasionally touched 20 percent. The logging system design used the following assumptions:

	Maximum uphill distance (feet)	**Maximum downhill distance (feet)**
Highlead	1,200	600
Small skyline	1,500	800
Large skyline	2,000	1,000
Helicopter	6,000	

After the initial unit delineation by the timber planner, other resource specialists reviewed the proposed units independently (multidisciplinary) and then participated in an interdisciplinary review to determine

the status of the unit. The IDT assigned ratings to each unit, based on individual and collective review. These ratings were intended to be used to help select units during NEPA alternative formulation, as well as to pass information from the planning team to field reconaissance personnel. These rating, or "status codes" include:

- unit appears OK
- unstable, oversteepened slopes which may not meet TLMP standards and guidelines
- requires fisheries review for anadromous streams
- requires on-ground logging system review
- requires on-ground road location review
- unit deleted; does not meet standards and guidelines
- poor potential for regeneration
- low volume; potentially non-commercial
- potential for caves
- located within identified goshawk management area
- located within Thorne/Hatchery Scenic/Recreation River corridor
- located within Sarkar Wild & Scenic River corridor
- does not meet NFMA dispersion requirement (greenup) at this time
- high hazard soils; review required
- high hazard soils; review recommended
- McGilvery soils present; potentially > 40%
- McGilvery soils present but likely < 40%
- potentially suitable for shovel logging
- unit partially logged; need new unit design
- adjacent to non-National Forest Service System land
- adjacent to Sarkar Primitive Recreation Area
- field documented high wildlife value
- riparian management.

The units and roads were then digitized back into the GIS database, incorporated with other site specific data, and transferred to another database management system for subsequent analyses, including proportionality determinations, timber economic analysis, etc.

The units developed from this inventory or MELP were used to define timber harvest units for alternatives considered under the CPOW EIS. In terms of site specificity, all units were reviewed by a multi-resource team using topographic maps and new aerial photos taken in 1991. The IDT spent approximately 10 field days during 1991 reviewing these units on the ground. In addition, another 30 or so units were reconned by Thorne Bay District personnel during the winter of 1991-92. In Spring 1992, Forest Engineering and Thorne Bay District presale personnel reviewed the units extensively using 1991 aerial photos, topo maps, and personal knowledge of the ground and made numerous suggestions and improvements to the proposed harvest units. These recommendations were used to improve and update the MELP.

The major field recon effort was initiated in July 1992 by field teams composed of Forest engineers and Thorne Bay layout and resource specialists. The purpose of the recon was to determine the feasibility of accessing and harvesting the unit according to the planned logging/transportation systems and to identify portions of the proposed unit which potentially could not be harvested within Forest Plan guidelines. Also providing recon information were soils scientists, fishery biologists, cave specialists, cultural resource technicians, and silviculturists. The following numbers of units were reconned:

logging/transportation feasibility	199
cave surveys	167
cultural resources surveys	96
soils surveys	28
fishery habitat surveys	14
stand exams	35

This information was also used to improve and update the MELP.

In December 1992 the IDT updated the MELP once again to incorporate the riparian standards and guidelines from the TLMP Revision into individual harvest unit design for the units considered in the CPOW Draft EIS. This update delineated areas which could be feasibly partial cut to meet no cut/partial cut prescriptions for certain riparian areas which extended beyond the TTRA 100-foot buffers. This process has not been completed for the MELP units that were not considered in the CPOW Draft EIS.

The MELP identified approximately 975 miles of previously unmapped streamcourses within the CPOW Project Area. These streams have been tentatively classified by fishery biologists. Although the potential harvest acres for the units proposed for harvest in the CPOW Final EIS have been re-calculated to reflect these newly classified streams, the MELP was not updated to incorporate this information, due to lack of precise stream location.

In summary, the MELP identified approximately 1,176 individual harvest units totalling 1.437 billion board feet. As a result of recon, there were units and portions thereof which were determined to not meet environmental regulations and/or standards and guidelines. These area totalled approximately 3,800 acres and 110 MMBF. These areas will be submitted for deletion from the Tongass timber base.

APPENDIX D

Response to Public Comments

Central Prince of Wales Final Environmental Impact Statement

TABLE OF CONTENTS

LIST OF COMMENTERS ON THE CPOW DRAFT EIS

NOTE: Numeric codes were assigned to written comments as they were received. Codes beginning with a letter indicate oral subsistence testimonies held in the following locations: C=Craig, CC=Coffman Cove, H=Hydaburg, K=Klawock, Kt=Ketchikan, S=Saxman, TB=Thorne Bay, WP=Whale Pass.

Code	Name	City/State	Organization
246	Adamson, Ed	Craig, AK	
177	Allphin, G.	Ketchikan, AK	
Kt3	Althorp, Cheryll	Ketchikan, AK	
192	Amundson, Rober W.	Ketchikan, AK	
250	Arnold, Glen T.	Longview, WA	
156	Arriola, Cindy	Ketchikan, AK	
067	Athorp, Mr.& Mrs. Fred	Ketchikan, AK	
253	Baar, D.R. Jr. (Pat)	Coffman Cove, AK	
254	Baar, Linda Sue	Coffman Cove, AK	
015	Baichtal, James	Ketchikan, AK	
123	Barnes, Paul	Gustavus, AK	
309	Bartos, Louie	Ketchikan, AK	
126	Beebe, Dave	Kupreanof, AK	City of Kupreanof
184	Begalka, Walter J.	Ketchikan, AK	
165	Bennett, Jill L.	Ketchikan, AK	
298	Bennett, J.L.	Ketchikan, AK	
071	Berry, Paul	Gustavus, AK	
041	Bishop, Brita	Juneau, AK	
274	Bishop, Charles W.	Ketchikan, AK	
138	Blake, Tilden	Wrangell, AK	
158	Blake, Garry C.	Ketchikan, AK	
310	Blasing, Larry	Ketchikan, AK	Alaska Forest Assn.
Tb3	Blubaum, John	Thorne Bay, AK	
180	Boehlert, Stephen H.	Ketchikan, AK	
024	Bolling, Jon	Craig, AK	
008	Brady, Len	Thorne Bay, AK	
295	Brady, Dorothy	Wrangell, AK	
068	Brakel, Judy	Gustavus, AK	
019	Branson, Peter	Wrangell, AK	
069	Brown, Mike	Ketchikan, AK	
227	Brown, Anna S.	Coffman Cove, AK	
032	Brylinsky, Scott	Sitka, AK	
H3	Burgess, Jan	Hydaburg, AK	
H4	Burgess, Victor	Hydaburg, AK	
007	Burmiester, William	Whale Pass, AK	
240	Buss, Wesley G.	Coffman Cove, AK	
007	Caitil, James	Whale Pass, AK	
124	Canterbury, Jackie	Ketchikan, AK	
003	Cartwright, Meg	Ketchikan, AK	
Kt4	Cartwright, Meg	Ketchikan, AK	
120	Castle, Brian	Craig, AK	
C5	Castle, Brian	Craig, AK	
093	Cebula, Jake	Thorne Bay, AK	

096	Chaco, Benny	Thorne Bay, AK	
097	Chaco, Lynn	Thorne Bay, AK	
035	Chapman, Michael	Ketchikan, AK	
057	Chapman, Ross	Clinton, WA	
099	Charles, Lillian E.	Saxman, AK	
218	Clark, Terry	Coffman Cove, AK	
220	Clark, Larry	Coffman Cove, AK	
299	Clark, Larry	Coffman Cove, AK	
022	Clarke, Marlene	Wrangell, AK	
107	Clayton, Elizabeth	Juneau, AK	
029	Clifton, John	Ketchikan, AK	
044	Coady, Jack	Ketchikan, AK	
046	Coffesi, Julia	Indianola, WA	
137	Coleman, Thomas D.	Lab Bay, AK	
160	Connelly, Carol R.	Ketchikan, AK	
297	Connelly, Steve	Ketchikan, AK	
141	Couturier, Richard	Craig, AK	
172	Coville, Edward M.	Ketchikan, AK	
062	Cox, William	Anchorage, AK	
053	Crandell, Rachel	Manchester, MO	
059	Crandell, Dwight	Manchester, MO	
169	Crumpton, Debbie	Ketchikan, AK	
290	Csiki, David A.	Ketchikan, AK	
266	Dale, Ralph S.	Ketchikan, AK	
025	Davis-Mohs, Danielle	Gold Bar, WA	
136	Deason, Jonathan	Washington, DC	USDI, Off.Env.Affairs
249	Deffenbaugh, Jeff	Craig, AK	
048	Dejka, Carol	Gustavus, AK	
181	Delano, Barbara	Ketchikan, AK	
106	Demars, Janet	Craig, AK	
173	Dickey, Darlene	Ketchikan, AK	
009	Dixon, Jane	Reno, NV	
007	Drariuren, Greg	Whale Pass, AK	
007	Dyson, Patrick	Whale Pass, AK	
101	Dyson, Pat	Whale Pass, AK	
282	Eakes, James C.	Ketchikan, AK	
241	Easom, Charles	Coffman Cove, AK	
242	Easom, Linda	Coffman Cove, AK	
263	Edenso, Ralph P.	Ketchikan, AK	
114	Edwards, Larry	Sitka, AK	Greenpeace
276	Errsberger, Garry M.	Ketchikan, AK	
199	Etherington, W.C.	Coffman Cove, AK	
007	Farley, Connie	Whale Pass, AK	
007	Farley, Michael	Whale Pass, AK	
129	Farnell, Richard	Juneau, AK	
122	Fecko, Cheryl	Craig, AK	
296	Fermass, Jeffrey	Ketchikan, AK	
046	Fishman, Nancy	Indianola, WA	
193	Fisk, Raymond L.	Coffman Cove, AK	
194	Fisk, Rowena G.	Coffman Cove, AK	
195	Fisk, Robin D.	Coffman Cove, AK	
293B	Flood, Jimmy R.	Hydaburg, AK	
102	Frank, Joyce	Saxman, AK	
S2	Frank, Joyce	Saxman, AK	
061	Franz, Richard	New Berlin, WI	
293	French, Kathleen	Ketchikan, AK	
057	Gambarini, Arthur	Clinton, WA	

TB1	Garner, Jack	Thorne Bay, AK	
134	Gates, Paul	Anchorage, AK	USDI, Off.Envir.Affairs
271	Gellings, Leo	Ketchikan, AK	
K1	George, Tom	Klawock, AK	
112	Geraghty, Sylvia	Tokeen, AK	ARRM
064	Gilbertsen, Neal	Ketchikan, AK	
109	Gleason, John	Juneau, AK	
148	Goldy, Vernon	Klawock, AK	
301	Gossman, Steve	Ketchikan, AK	
157	Gotelli, Carleen	Ketchikan, AK	
115	Graham, Owen	Ketchikan, AK	
078	Gresham, Kevin Sr.	Thorne Bay, AK	
222	Grimes, Sharon M.	Coffman Cove, AK	
223	Grimes, Dennis	Coffman Cove, AK	
031	Guidry, John	Hinesburg, VT	
191	Guymod, M.A.	Ketchikan, AK	
154	Hagan, S.L.	Ketchikan, AK	
247	Hall, Gordon	Sitka, AK	
153	Hanks, Jason L.	Ketchikan, AK	
037	Hannan, George	Coffman Cove, AK	
117	Hannan, Sara	Juneau, AK	
119	Hannan, Ellen	Craig, AK	
C1	Hannan, Ellen	Craig, AK	
014	Hanson, Alice	Wrangell, AK	Wrangell Resource Council
285	Harbour, Janice G.	Ketchikan, AK	
286	Harbour, Donald C.	Ketchikan, AK	
132	Hardcastle, Richard	Ketchikan, AK	
149	Harper, Melvern F.	Klawock, AK	
203	Hayes, Donald L.	Coffman Cove, AK	
289	Hayes, Allyn	Ketchikan, AK	
162	Heath, Charlanne	Ketchikan, AK	
260	Hendricks, James E.	Ketchikan, AK	
262	Hendrickson, Wayne D.	Ketchikan, AK	
202	Henry, Matthew W.	Coffman Cove, AK	
204	Hepokoski, Jim	Coffman Cove, AK	
175	Hildebrandt, Gerard E.	Ketchikan, AK	
245	Hill, Bob L.	Craig, Ak	
wp1	Hillas, Sharon	Whale Pass, AK	
046	Hilton, Lela	Indianola, WA	
056	Hoffman, Philip	Kona, HI	
142	Hoffman, Carl C.	Craig, AK	
145	Hoffman, Michaelle D.	Craig, AK	
146	Hoffman, Allen E.	Craig, AK	
163	Hofstedt, Shannon D.	Ketchikan, AK	
027	Hollywood, Bill	Ketchikan, AK	
064	Holum, Deidra	Ketchikan, AK	
072	Holum, Orvil	Ketchikan, AK	
072	Holum, Carmen	Ketchikan, AK	
Kt6	Holum, Carmen	Ketchikan, AK	
010	Hoppen, Guy	Gig Harbor, WA	
010	Hoppen, Ann	Gig Harbor, WA	
057	Houting, Kim	Clinton, WA	
140	Howell, Danial K.	Craig, AK	
046	Hughes, Holly	Indianola, WA	
150	Hutchens, Willard N.	Klawock, AK	
033	Hutchins, Michael	Thorne Bay, AK	
188	Inglis, Richard A.	Ketchikan, AK	

Kt2	Isley, Elzie	Ketchikan, AK	
081	Jacobsen, Thomas	Sitka, AK	
302	Jacoby, Steve	Juneau, AK	Off.of Governor
303	Jacoby, Steve	Juneau, AK	Off.of Governor
267	Johnson, Clyde L.	Ketchikan, AK	
212	Johnstun, Jess Jr.	Coffman Cove, AK	
C6	Jones, Jerry	Craig, AK	
304	Jorgensen, Fred	Ketchikan, AK	
K2	Joseph, William	Klawock, AK	
C2	Kathleen, Nola	Craig, AK	
020	Katz, Dave	Ketchikan, AK	Tongass Conservation Soc.
Kt9	Katz, Dave	Ketchikan, AK	Tongass Conservation Soc.
046	Kelly, Sheila	Indianola, WA	
046	Kep, Thomas	Indianola, WA	
161	Kero, Nelo M.	Ketchikan, AK	
261	Kiffer, Kenneth J.	Ketchikan, AK	
210	Kilanowski, Jerry	Coffman Cove, AK	
300	Kilanowski, Jerry	Ketchikan, AK	
007	Kimzey, Peter	Whale Pass, AK	
176	Klune, David	Ketchikan, AK	
189	Klune, Louise S.	Ketchikan, AK	
168	Knapp, Vivian	Ketchikan, AK	
087	Knotts, Robert	Craig, AK	
S1	Kushnick, Matilda	Saxman, AK	
238	Lamb, Mary Ann	Coffman Cove, AK	
239	Lamb, Richard A.	Coffman Cove, AK	
254B	Lamoureux, Art	Coffman Cove, AK	
H1	LeCornu, Vickie	Hydaburg, AK	
H2	LeCornu, Adrian	Hydaburg, AK	
005	Leibowitz, Beth	Juneau, AK	
034	Leighty, Jack	Huntingtown, MD	
133	Lesh, David	Glacier Bay, AK	Gustavus Inn
007	Lief, D.G.	Whale Pass, AK	
021	Lindekugel, Buck	Juneau, AK	SEACC
028	Llanos, James Sr.	Ketchikan, AK	
270	Longfield, Julia	Ketchikan, AK	
228	Lopeman, Jeremy W.	Coffman Cove, AK	
125	Ludwigsen, Don	Thorne Bay, AK	
144	Lutton, Jerry L.	Craig, AK	
237	Mabee, Carolyn J.	Coffman Cove, AK	
075	Mackovjak, James	Gustavus, AK	Pt.Adolphus Seafoods
265	Madden, R.A.	Ketchikan, AK	
284	Madden, Judy	Ketchikan, AK	
179	Markuson, Steve	Ketchikan, AK	
275	Martin, J. David	Ketchikan, AK	
086	Maughan, Ralph	Pocatello, ID	
Tb2	McCord, Fred	Thorne Bay, AK	
098	McDonald, Victoria	Petersburg, AK	Narrows Conserv.Coal.
206	McDonald, Michael D.	Coffman Cove, AK	
207	McDonald, David	Coffman Cove, AK	
208	McDonald, Debra L.	Coffman Cove, AK	
209	McDonald, Daniel J.	Coffman Cove, AK	
225	McDonald, Patrick J.	Coffman Cove, AK	
229	McDonald, Lynn I.	Coffman Cove, AK	
196	McDowell, Brenda	Coffman Cove, AK	
200	McDowell, Robert L.	Coffman Cove, AK	
167	McGarrigan, Paul A.	Ketchikan, AK	

287	McKinley, Michael R.	Ketchikan, AK	
007	McRea, Mary	Whale Pass, AK	
231	Means, John W.	Coffman Cove, AK	
280	Meredith, Steve	Ketchikan, AK	
118	Merritt, Victoria	Craig, AK	
185	Meske, Sandra J.	Ketchikan, AK	
057	Mestemacher, Frank	Clinton, WA	
016	Monteith, Daniel	Ketchikan, AK	
Kt11	Monteith, Daniel	Ketchikan, AK	
S3	Montieth, Daniel	Ketchikan, AK	
042	Moore, Craig	Naukati, AK	
292	Morgan, Timothy Z.	Ketchikan, AK	
060	Morris, Adrian	Klawock, AK	
110	Morris, Jim	Boulder, CO	
049	Morse, Judith	St. Louis, MO	
178	Mortensen, George	Ketchikan, AK	
186	Mounts, Cheryl A.	Ketchikan, AK	
Kt10	Mukua, Chris	Ketchikan, AK	
Kt8	Mura, Ed	Ketchikan, AK	
127	Murray, John	Juneau, AK	
277	Muzzana, Patricia A.	Ketchikan, AK	
113	Myren, Richard	Juneau, AK	
052	Nelson, Lee	Owensboro, KY	
219	Nelson, Les D.	Coffman Cove, AK	
076	Nicholson, Lynn	Thorne Bay, AK	
076	Nicholson, Jessie	Thorne Bay, AK	
079	Nicholson, Bob	Thorne Bay, AK	
084	Nilson, Douglas	Pocatello, ID	
151	Ninemine, William S.	Klawock, AK	
264	Olsen, Linnaea A.	Ketchikan, AK	
268	Olsen, Roger D.	Ketchikan, AK	
050	Olsson, Kris	Ann Arbor, MI	
090	Opp, Elizabeth	Gustavus, AK	
090	Opp, Michael	Gustavus, AK	
198	Page, Michelle	Coffman Cove, AK	
205	Page, Kenneth J.	Coffman Cove, AK	
036	Paris, Steve	Gig Harbor, WA	
116	Pavia, Clare	Juneau, AK	
083	Pennoyer, Steven	Juneau, AK	Nat'l.Marine Fish.Serv.
105	Peterson, Al	Ketchikan, AK	Soc.American Foresters
278	Pierce, William R.	Coffman Cove, AK	
279	Pierce, Marilyn L.	Coffman Cove, AK	
018	Pihl, Martin	Ketchikan, AK	Ketchikan Pulp Co.
Kt5	Potter, Carla	Ketchikan, AK	
057	Powers, Ed	Clinton, WA	
252	Price, Guy M.	Aberdeen, WA	
288	Rambosele, Henry G.	Ketchikan, AK	
026	Rehfeldt, Jim	Juneau, AK	
155	Renda, Beth R.	Ketchikan, AK	
C3	Rhoades, Doug	Craig, AK	
058	Richter, Karl	Haines, AK	
183	Robb, Richard S.	Ketchikan, AK	
226	Rodriguez, Joshua J.	Coffman Cove, AK	
230	Rodriguez, Jonathan V.	Coffman Cove, AK	
058	Rosenthal, Keri A.	Haines, AK	
143	Russell, Dan	Craig, AK	
039	Sallee, Mike	Ketchikan, AK	

170	Sallup, Ronda	Ketchikan, AK	
131	Sanchez, Kenneth	Bismark, ND	
Tb4	Savage, Lloyd	Thorne Bay, AK	
190	Schenek, Sandra L.	Ketchikan, AK	
164	Schmitt, Terry	Ketchikan, AK	
211	Sellards, Darrel	Coffman Cove, AK	
216	Sellards, Barbara	Coffman Cove, AK	
111	Seward, Alma	Douglas, AK	
C4	Shafer, Frederick	Craig, AK	Ketchikan Pulp Co.
121	Sharrard, Jerry	Craig, AK	POW Conservation League
040	Shaw, Albert	Juneau, AK	
147	Shelley, Harvey G.	Klawock, AK	
234	Shingleton, Charles W.	Coffman Cove, AK	
013	Shoaf, Bill	Ketchikan, AK	
030	Silver, Dan	Los Angeles, CA	
258	Silvey, Rodney D.	Coffman Cove, AK	
244	Sinclair, Jeff	Klawock, AK	
152	Singer, William R. Jr.	Ketchikan, AK	
011	Smith, Peter	Ketchikan, AK	Karst Research Group
171	Smith, Eugene C.	Ketchikan, AK	
215	Soderberg, Gary D.	Coffman Cove, AK	
217	Soderberg, Katie	Coffman Cove, AK	
235	Soderberg, Jean L.	Coffman Cove, AK	
221	Sondenaa, Anita	Coffman Cove, AK	
224	Sondenaa, Leroy	Coffman Cove, AK	
063	Spreyer, Frank	Barrington, IL	
007	Sproling, Clay	Whale Pass, AK	
Kt7	Stallings, Shelley	Ketchikan, AK	
213	Stecklein, Lesley E.	Coffman Cove, AK	
214	Stecklein, Nanine A.	Coffman Cove, AK	
232	Stecklein, Joseph V.	Coffman Cove, AK	
233	Stecklein, Vanessa E.	Coffman Cove, AK	
236	Stecklein, Chelsea A.	Coffman Cove, AK	
182	Stidd, Jerry W.	Ketchikan, AK	
248	Stocks, Mike K.	Longview, WA	
243	Strago, Stan	Coffman Cove, AK	
135	Stratton, Jim	Anchorage, AK	
057	Strevy, Phil	Clinton, WA	
057	Stringer, R.	Clinton, WA	
007	Stuart, Peter	Whale Pass, AK	
001	Sudbrock, Andrew	Juneau,AK	
092	Swanson, John	Minneapolis, MN	
197	Sweathen, William B.	Coffman Cove, AK	
281	Tallman, Karla	Ketchikan, AK	
073	Tanner, Charlotte	Petersburg, AK	
007	Taylor, Susan	Whale Pass, AK	
023	Taylor, Gilday	Long Branch, NJ	
007	Templi, Craig	Whale Pass, AK	
002	Tennyson, Todd	Anaheim, CA	
002	Tennyson, Eleanor	Anaheim, CA	
070	Thompson, Judy	Metairie, LA	
074	Thompson, Brian	Thorne Bay, AK	
077	Thompson, Susan	Thorne Bay, AK	
251	Tippery, Bill	Longview, WA	
045	Twardock, Paul	Palmer, AK	Nat'l.Outdoor Ldrshp.Sch.
C8	Twitchell, Tom	Craig, AK	
046	Tyley, Paige	Indianola, WA	

043	Valentic, Wayne	Ketchikan, AK	
088	Van Valin, Glen	Juneau, AK	
007	Vasser, Jenny	Whale Pass, AK	
007	Vasser, Robert	Whale Pass, AK	
047	Vasser, Jenny	Whale Pass, AK	
080	Vasser, Randy	Thorne Bay, AK	
306	Veit, Kathy	Seattle, WA	EPA
103	Voorhees, Linda	Whale Pass, AK	
007	Vourhees, Linda	Whale Pass, AK	
089	Wallin, Janet	Wrangell, AK	
051	Warth, John	Seattle, WA	
294	Warth, John	Seattle, WA	
054	Wayburn, Edgar	San Francisco, CA	Sierra Club
082	Wayburn, Cynthia	Sitka, AK	
269	Weisgram, Kenneth L.	Ketchikan, AK	
085	Weist, Randy	Juneau, AK	
007	Welch, Gerald	Whale Pass, AK	
007	Welch, Patricia	Whale Pass, AK	
272	Weston, Gerald R.	Ketchikan, AK	
007	White, Valery	Whale Pass, AK	
012	White, Valery	Whale Pass, AK	
273	White, Thomas H.	Ketchikan, AK	
091	Whytal, Sharon	Juneau, AK	
100	Williams, Joe II	Ketchikan, AK	
K3	Williams, Sylvester	Klawock, AK	
006	Wilson, Richard	Des Plaines, IL	
139	Winsenberg, Carl E.	Craig, AK	
C7	Wisenberg, Carl	Craig, AK	
307	With, Ralph	Sarkar Cove, AK	
307	With, Janice	Sarkar Cove, AK	
159	Wold, Jeffrey H.	Ketchikan, AK	
201	Wolfe, Rickie L.	Coffman Cove, AK	
255	Wolfe, Ronald	Coffman Cove, AK	
283	Wolfe, Dennis	Ketchikan, AK	
128	Woods, Cat	Thorne Bay, AK	
017	Wright, Brenda	Juneau, AK	
055	Wright, Gladys	W.Lafayette, IN	US Collegiate Wind Band
130	Wright, Brenda	Juneau, AK	
166	Young, Marla	Ketchikan, AK	
187	Young, Cyril J.	Ketchikan, AK	
256	Young, Ruby Ann	Coffman Cove, AK	
257	Young, Richard P.	Coffman Cove, AK	
259	Zadina, Lauri L.	Ketchikan, AK	
291	Zastrow, Edward W.	Ketchikan, AK	
108	Ziesak, R.M.	Ketchikan, AK	
Kt1	Ziesak, Roger	Ketchikan, AK	

RESPONSE TO PUBLIC COMMENTS on the Central Prince of Wales Draft EIS

INTRODUCTION

The USDA Forest Service, Tongass National Forest, Ketchikan Area, received a total of 374 written and oral comments on the Ketchikan Pulp Company Long-Term Timber Sale Contract, Central Prince of Wales Draft Environmental Impact Statement. Letters were assigned a number code as they arrived. Responses from the community Subsistence Hearings (34 individuals) were given a letter-number code corresponding to the community where the hearing was held and the order in which the speaker was heard. The Interdisciplinary Team thoroughly and objectively read and analyzed every written response and subsistence testimony and categorized each expressed issue or concern. These identified issues were then sub-divided or grouped as appropriate to facilitate response. Due to the exceptionally voluminous comments received, the comments have been summarized, rather than included in their entirety, in compliance with 40 CFR 1503.4(5)(b). Copies of all letters and a transcript of subsistence testimonies are included in the CPOW Planning Record.

Use of public comments is not a vote counting process; all comments were read carefully and considered during the preparation of the Final EIS. All issues and document-specific comments are responded to in this appendix. As a result of public comment, two issues have been elevated to significant issues in the Final EIS; these issues had been analyzed in the Draft EIS as sub-issues. The alternatives have been modified based on the comments, and a new alternative (F6) has been analyzed based on the issues and concerns derived from the public comments. New or expanded analyses have been done in the Final EIS to address public concerns.

The format for discussing the Forest Service Response to Public comments in this appendix is as follows:

1. Statement of the main issue or comment, with a brief summary of the range of comments;
2. Statement of relevant sub-issue or sub-topic;
3. List of organizations or individuals who addressed the issue, by code number;
4. Examples of specific statements from the actual written responses or subsistence testimonies that reflect the full range of public input on the issue;
5. Forest Service Response.

The Forest Service Response provides an overview of Forest Service policy or direction regarding the issue, discusses how the issue has been addressed, and directs the reader to the appropriate section of the FEIS for a more complete discussion. Issues 1-9, 12-14, and 17 of this appendix are also discussed in detail in Chapter 1.

1. COST EFFECTIVENESS OF TIMBER HARVEST OPERATIONS

There was a wide range of public comments under this general issue related to timber economics and practices, including: economical viablility of offering areas to both KPC and the Forest Service, proportionality, harvest systems other than clearcutting, export of logs, size of harvest units, and others.

1a. Economical harvest for KPC

Letters and Comments on this Subject Included:

043 044 069 074 077 079 097 105 108 115 137 138 139-146 147-151 152-173 175-192 193-243 244 254 247 248 249 250 251 252 253 254A 254B 255 256 257 258 259-271 280 281 282 283 284 285 286 287 291 292 293 296 297 298 299 301 C4 C5 C7 TB2 KT1

Examples Include:

"Recent timber layout has been pathetic from an economic point of view. It seems that sales are designed to bring a negative return. I know all the rhetoric and excuses about ecosystem management. The people of the United States deserve to have their resources developed in an economical manner." 044

"The economic analysis for all CPOW alternatives needs to be improved and updated. Good economics is important and should play a larger role in how the USFS looks at the alternatives." 137-244, 247-271, 280-288, 291-293

"Expensive (uneconomic) logging, whether due to poor timber or helicopter yarding creates a poor stumpage return. This reflects badly on the U.S.F.S. and the logger. The logger especially feels frustrated because he cannot choose the timber or the yarding method. More, much more, consideration has to be given to the economics of timber sales." 297

Forest Service Response:

The Midmarket Assessment for the project alternatives was performed as directed in the Forest Service Handbook 2409.18 (Sale Preparation), R-10 Supplement No. 2409.18-91-1. This R-10 Supplement requires that factors used in calculating the estimated timber values must be based on the Regional mid-market timber values and logging costs which were in effect the date the Notice of Intent for the project was issued (August 30, 1991). The R-10 Supplement also requires that 60 percent of normal profit and risk must be used in the midmarket assessment as this is the minimum margin for profit and risk that must be met in order for the sale to be considered an economical offering. Based on this midmarket assessment, all alternatives in the Final EIS have positive mid-market stumpage values.

To provide the decision maker with an analysis of changed conditions, the FEIS also displays appraised rates calculated from timber values and logging costs in effect April 1, 1993 and using full profit and risk. These values reflect the most current information available, including updated costs for helicopter yarding. The results indicate a negative stumpage value for each alternative. However, prices have been recently increasing, and it is expected that the first CPOW timber offerings will appraise positively at full profit and risk. Actual contract rates will be calculated for each Offering Area based on selling values applied to cruised timber volumes and log grades from which logging costs will be subtracted based upon as-laid-out harvest units and as-designed roads. See the Timber section of Chapter 3 for detailed results and discussions.

1b. Proportionality/inaccurate TIMTYP maps

Letters and Comments on this Subject Included:

020 021 105 114 115 121 134 302 C7

Examples Include:

"Proportionality. Proportionality must be met on an ongoing basis. It is unacceptable for the agency to say its harvest will become proportional sometime in the future -- but not now. Proportionality should be provided for each individual offering, because the company may now reject offerings. The results of on-the-ground unit surveys done for timber inventory and unit layout must be displayed, as in Kelp Bay and SE Chichagof EIS'S.... The December 11, 1991 memo...points out that cutting retention could create proportionality problems for the DEIS, which was proportional before retention was considered. The agency elected to cut these acres and should explain how that affected proportionality." 020

"The current Forest Service treatment of proportionality is so extremely biased toward preserving high volume old-growth that the original intent of the proportionality requirement in the Tongass Timber Reform Act has completely lost its meaning and is simply viewed now as a burden imposed upon the Long Term Contracts and the Government by a fearful bureaucracy." 115

"TTRA directed the Forest Service to stop the level of "high-grading" that has gone on in the Tongass. However, the timber-type maps used in determining volume classes have been shown to be highly inaccurate. J.E. Brickell, in a 'Review of Forest Inventory Methodology and Results' on pp. 21-22 observed that 'if anyone tries to make a volume inference from (figures based on volume class acres from TIMTYP maps) which they probably will since acres are labeled by volume class, then the resulting volume is likely to be quite incorrect.'" 121

Forest Service Response:

The Timber section of Chapter 3 quotes Section 301(c)(2) of TTRA which provides the legal requirement for proportionality. This law was to to be implemented February 28, 1991 (90 days from date of passage of the TTRA). It was determined that the proportionality base was to be calculated at a snapshot in time, using the TIMTYP map in the Forest Service Geographic Information System (GIS), as of November 28, 1990. TIMTYP is the timber resource base used by the TLMP as amended (1979) that displays, among other things, the inventoried volume class distribution of the Forest. This was the best available information and was used to calculate the proportionality base for each Management Area. The Management Areas used in the calculations of the proportionality bases (published in the Forest Service Handbook and used in the proportionality analysis in the CPOW Draft EIS) followed the management area boundaries delineated by the TLMP Revision 1991a. Subsequently, it was determined that the intent of TTRA was to use the management area boundaries established in the existing TLMP 1986. New proportionality bases were calculated using the TLMP 1986 management areas and included within the proportionality analysis in the Timber section of Chapter 3.

Direction contained in Forest Service Handbook 2409.18, Region 10 Supplement No. 2409.18-92-5 was followed in the projection of this project's compliance with the TTRA proportionality requirement. To account for harvest which has occurred within the Project Area since the TIMTYP map was frozen with the passage of TTRA, analysis used the recently revised GIS clearcuts layer, which showed the final configuration of timber harvest under the 1989-94 LTS EIS. Each of the project's action alternatives was determined to meet the proportionality requirement of the TTRA. In addition, all alternatives were within Forest Service Handbook tolerances, for all Management Areas except K03. Implementation of the Lab Bay EIS (which contains the bulk of K03) will correct the situation. The Forest Service preferred alternative (F5) defers

harvest of all volume class 6 and 7 in K03. This determination includes assessment of proposed harvest on areas identified by the 1989-94 LTS EIS to be managed to provide old-growth habitat conditions. While the R-10 Supplement requires that each proposed alternative meet proportionality requirements, the final determination of proportionality is based upon the harvested, as opposed to the planned, configurations of the units.

1c. Should consider alternatives to clearcutting

Letters and Comments on this Subject Included:

010 036 045 084 303

Examples Include:

"The U.S.F.S. must discourage clearcutting in favor of selective cutting." 010

"The massive clearcutting proposed in all but one of the Alternatives would reduce the area's appeal to coastal based wilderness travel such as kayaking. Basically by implementing heavy clearcutting in the area, the Forest Service would lose all potential future value the area has for expanded wilderness recreational use." 045

"...[There should be] less and less reliance on clearcutting." 084

Forest Service Response:

The Forest Service preferred alternative (F5) contains increased emphasis on the use of uneven-aged management. This alternative has 8,257 acres proposed to be harvested by clearcutting and 1,579 acres to be harvested by other methods. The selection of clearcutting as the primary method of timber harvest for this project was evaluated and is consistent with the Chief of the Forest Service's direction to reduce the amount of clearcutting on National Forest lands (June 4, 1992 letter to Regional Foresters and Station Directors). For a discussion of how CPOW addresses the seven points contained in the Chief's letter, see the Timber and Vegetation section of Chapter 3. In response the Region's implementation plan to address the Chief's direction on reduced use of clearcutting, clearcutting remains the most widely used method of timber harvest for this project and is based on recommended prescriptions developed by a certified silviculturist to ensure adequate regeneration and stocking levels. Other silvicultural treatments included in the FEIS are shelterwood harvest to enhance regeneration of Alaska yellow cedar, seed tree harvests, partial cut harvests to mitigate adverse effects on visual quality, partial cut harvests adjacent to areas managed for primitive recreation, uneven-aged management within riparian areas, and wildife islands (clumps of reserve trees) to promote structural within-stand diversity.

1d. Don't subsidize KPC

Letters and Comments on this Subject Included:

010 011 012 087 098 111 114 116 121 C6 KT10

Examples Include:

"If large corporations can't economically survive then obviously there is no economical reason to subsidize them for another moment." 010

"The current timber market will not meet the inflated estimates of stumpage value (DEIS, pg 13). At the present time the Forest Service is scrambling to subsidize the pulp mills, having just reimbursed KPC and APC with credits coming close to $20 million dollars. Since the Tongass timber program has cost the U.S. taxpayer $15.6 million in 1991, and the current timber market is very soft, we believe the estimates are false." 098

"Further, as a U.S. taxpayer, I oppose the subsidization of timber companies in general and the Ketchikan Pulp Mill in particular. I truly understand the need for the USFS to negotiate with these people, and I empathize with the pressure under which you must operate. But please, please remember your obligation to us little guys who foot the bill." 111

Forest Service Response:

The Forest Service does not subsidize KPC or other companies. It is Forest Service policy to offer all timber purchasers an economically viable timber sale. During the NEPA analysis for a proposed timber sale in Region 10, the Forest Service performs a mid-market assessment of timber economic conditions present at the time of the Notice of Intent. The response to Issue 1a and the Timber section of Chapter 3 explain some of the analyses used to assess the timber economics of the alternatives.

Individual timber offerings arising from CPOW will be cruised and appraised to estimate applicable timber values and associated logging and processing costs, using site-specific timber conditions and up-to-date costs and values at the time of the offering. In addition, indicated stumpage values will be adjusted to develop rates which more fully reflect higher stumpage costs associated with the competitive bidding process in independent timber sales. This process is fully intended to make the stumpage rates assessed KPC to be comparable with rates charged to independent buyers of Tongass National Forest timber.

The Timber and Vegetation section of Chapter 3 displays the four most recent years of TSPIRS reports, which have been agreed upon by Congress, GAO, and the USFS to provide the best basis for evaluating timber sale profitability. These reports, which show gross receipts before payments are made to the State of Alaska, indicate a positive program in three of the past four reporting years available at the time of publication.

See also response to #14.

1e. Don't export round logs

Letters and Comments on this Subject Included:

010 036 039 125 H3

Examples Include:

"As a woodworker and shipwright I can say absolutely that prime Sitka Spruce and Alaska Yellow Cedar is barely available domestically-- we're shipping it overseas. Small logging operations and specialty mills should be allowed to draw from the Tongass. Through careful extraction of saw logs and their milling they can provide high quality wood domestically and let the wood drift up in value to its rightful worth." 010

"Old growth and old second growth are far too valuable to be clear cut away, shipped overseas as raw, whole logs, cut up into pulp or even just dimensional lumber." 036

"It's not multiple use to export 80% of the cedar logs in the round because the primary local industry doesn't use much cedar. While my own Mobile Dimension mill produces too much waste in sawdust to compete with more efficient mills for top grade cedar, I find it ironic that local governments and politicians ignore the export of jobs in the form of round cedar logs while babbling about the need for jobs." 039

"I want to see sustained yield. And processing here at home. Why should I have to buy Canadian finished lumber--when we could have that type of processing and the jobs that go with it right here on P.O.W.? The Japanese have to be laughing at us exporting round logs and processing jobs to them. And the cost of those logs? PEANUTS." 125

Forest Service Response:

Resolution of this issue is beyond the scope of this EIS, but it is discussed here to respond to public comment. Section B0.15 of the KPC Long-term Contract requires that the primary manufacture of timber harvested from National Forest lands be performed in Alaska, except for cedar, which may be exported as unprocessed logs under certain conditions. The Regional Forester authorizes export of western red cedar and Alaska yellow cedar, subject to periodic review. Currently, the facilities for complete processing of these wood products within Alaska are limited. If local demand and processing capability is increased, the Regional Forester's decision on cedar export may be reconsidered. Even though cedar is currently allowed to be exported, there is nothing stopping local processing.

1f. Helicopter cost estimates are too low

Letters and Comments on this Subject Included:

018 108 115 C7 KT1 KT2

Examples Include:

"We notice the estimate of helicopter logging cost is understated by more than $100/MBF. Consequently any comparison between alternatives with and without helicopter logging is substantially flawed (especially since the alternatives with helicopter logging are around 25% helicopter)." 018

"Your economic analysis is substantially flawed in some cases because the helicopter logging cost is severely understated." 115

"Helicopter costs on the study area should be updated. They are are out of date. I believe the Regional Office is currently going through the scenario of getting costs up to current levels. That should be used in computing stumpage returns to the government." KT1

Forest Service Response:

The Regional Office previously published a Region 10 specific helicopter cost estimation guide, updated every quarter. The DEIS used this estimation guide in its mid-market assessment, which was in the $156 - 199 range (depending on volume class). Since publication of the DEIS the Region has moved to an improved cost estimation guide based upon a computer program (HELIPACE), which considers such factors as volume-per-acre, piece size, yarding distance, elevation difference between unit and landing, scaling defect, and silvicultural treatment. HELIPACE provided a considerably higher helicopter yarding cost estimate, which was used in both the mid-market and current value analyses in the Timber section of Chapter 3. The indicated costs were in the $231 - 272 range for the mid-market and $248 - 291 range

for the current value analyses (the lower value is for clearcut harvest and the higher value for partial cut harvest).

1g. Volume-per-acre estimates are too high

Letters and Comments on this Subject Included:

074 108 137-151 152-173 175-252 255-284 287-289 291-293 293B 296 299-301 C7 C8 KT1

Examples Include:

"Of the 290 MMBF in the alternatives it appears up to 60 MMBF may not actually exist due to over estimates of volume per acre by the Forest Service. It is essential that this be corrected." 137-252 255-284 287-289 291-293B

"I believe the volume estimates on most of the units are grossly overestimated." 296

"I believe the evaluations that were done on all the actual alternatives, quite a substantial number of units, incorrect volumes per acre were used. The numbers that were used in calculations were too high for several of the units. I think this needs to be re-evaluated." KT1

Forest Service Response:

Timber volumes actually offered to KPC will be based upon statistically valid cruises of laid-out units. Timber volumes for each individual unit proposed for harvest were calculated by first breaking the area into individual volume class strata according to the Forest TIMTYP map and then multiplying volume-per-acre figures for each volume class strata. These volume-per-acre figures are based upon site-specific silvicultural stand exam data, as discussed in Chapter 3, Timber and Vegetation. The average volume per acre as calculated for this project is approximately 29 MBF/Acre. For comparison purposes, scaled timber volumes from the 1989-94 LTS EIS for KPC averaged approximately 28.5 MBF/acre (see Chapter 3, Timber and Vegetation).

1h. Opportunities for shovel logging are not identified

Letters and Comments on this Subject Included:

021 108

Examples Include:

"The DEIS also fails to identify specifically which units are suitable for shovel logging (DEIS page 3-92). Waiting to decide this question until harvest unit layout is insufficient, particularly because of problems noted with shovel logging in the 1991 BMP Implementation Monitoring Report. These problems must be identified in the DEIS and steps taken in response to unit monitoring should be disclosed and analyzed." 021

"Where soil conditions permit, shovel logging should be allowed on slopes in excess of 20%." 108

Forest Service Response:

Units which were tentatively identified as being suitable for shovel yarding were indicated as such on the DEIS unit cards. In addition, the DEIS displayed the acres suitable for shovel yarding (page 3-92). This analysis was expanded in the FEIS by showing specific shovel yarding areas on the unit cards. These areas were identified during office and field reconnaissance and evaluated by a soils scientist to determine which areas fully met Regional Guidelines for shovel logging (Forest Service Handbook 2509.22, Soil and Water Conservation Handbook, BMP 13.7). The Handbook states, "...slopes up to 20% may be suitable for shovel yarding. On steeper slopes, an IDT should be consulted." On slopes in excess of 20% there may be too much ground disturbance (depending on soil type) from the tracks of the loader to permit this logging system. The areas which were determined to be suitable were costed for shovel yarding in the mid-market analysis in Chapter 3, Timber and Vegetation.

1i. MELP was done outside NEPA

Letters and Comments on this Subject Included:

021

Examples Include:

"In addition, the Forest Service reliance on the 1992 multi-entry layout plan for tentatively identifying cutting units and roads necessary to cut 290 MMBF in this project is unlawful. The MELP plan is unlawful because it was conducted completely outside the NEPA process." 021

Forest Service Response:

A Multi-Entry Layout Plan (MELP) is not a decision and therefore does not require a NEPA document in and of itself. It is simply a process to identify logical harvest and road options, from which alternatives are developed to meet the purpose and need of a project. The CPOW MELP was done in an interdisciplinary manner by the planning team assigned to the CPOW project. The MELP remains the basic building block of the FEIS and, as such, is part of the NEPA process. Harvest unit boundaries and associated roads in the MELP are dynamic in nature. They have become increasingly site specific, based upon better information, including: 1991 aerial photography; peer review by a team of layout foresters and engineers; and an extensive field reconnaissance by layout foresters, road engineers, fishery biologists, cultural resource specialists, silviculturists, cave specialists, soil scientists, and landscape architects.

1j. Road construction standards should be case by case

Letters and Comments on this Subject Included:

108 299

Examples Include:

"...when full bench construction is an option it should not be automatically required, rather, any decisions on where it will be required should be on an on-site, case-by-case basis." 108

"In places where the road can be moved up or down to get on a bench rather than make a full bench cut this should be done." 299

Forest Service Response:

Road construction standards are developed on a case-by-case basis. The Forest Service Handbook 2509.22, Soil and Water Conservation, BMP 14.7) states, "when topographic and drainage conditions allow, design Forest roads with a balanced cut/fill to reduce the amount of excavation and size of fills, except on areas requiring end haul for stability reasons. Under special circumstances, full-bench cuts with end haul may be required." Proposed CPOW road locations are designed to avoid full bench construction due to its adverse effects on soil and water resources. The actual determination of whether full-bench construction is essential is made during project implementation. After road locations are established and reviewed, the route is surveyed, and the survey data is used to design the road for construction. During the design phase, decisions on whether full bench construction is necessary are made on a case-by-case basis. Factors influencing whether or not full bench construction is to be utilized are: ground slope, proximity to streams, soil type, and applicable BMP's.

1k. Reduce size of clearcut harvest units

Letters and Comments on this Subject Included:

042 062 125 128 134 TB4

Examples Include:

"Very large clearcuts should be avoided, and more corridors should be retained between clearcuts." 042

"Another concern regards units which exceed 100 acres. In Alaska, unit size is restricted in accord with the National Forest Management Act to be 100 acres or less. Certain allowances can be made to increase the unit size. How many units under CPOW are larger than 100 acres? Do they meet all the criteria for exceeding 100 acres as outlined in NFMA or is the intent of making units larger simply to increase harvest volume? If so, I think this is a violation of the act and therefore, breaking the law." 128

"If clearcuts are used, small units close together are desired compared to scattering large harvest units that would have a greater adverse impact on species sensitive to edge effect." 134

Forest Service Response:

The maximum created opening size permitted in the hemlock-Sitka spruce forest type is 100 acres [36 CFR Ch.II Sec 219.27(d)(2)], except where larger openings are permitted, or where larger units produce a more desirable combination of public benefits [36 CFR Ch.II Sec 219.27(d)(i) and (ii)]. The average unit size considered for harvest by the FEIS is approximately 42 acres, including 4 units which exceed 100 acres in size. The selected alternative will produce only two openings larger than 100 acres. There are numerous instances where individual, smaller, adjacent units are combined to create contiguous openings greater than 100 acres. Three of these unit "clusters" are treated as exceeding the 100 acre limit and are discussed in the Timber and Vegetation section of Chapter 3, along with the reasons for the proposed larger unit in accordance with the Alaska Regional Guide. In all other instances, the oversized units will specify 300-500-foot leave strips to be left so that no opening exceeds 100 acres.

1I. DEIS calls for too much helicopter yarding

Letters and Comments on this Subject Included:

074 079 096 108 137-151 152-173 175-281 283-289 292-293 293B 296-301 TB2 TB4 KT2

Examples Include:

"If helicopter logging is required it should only be used where units cannot be logged by conventional means. Because of the high danger and poor economics the less helicopter logging the better." 079

"Any helicopter units that can be harvested more economically with a conventional system (including multispan, cold decks, etc.) should be redesignated and in any event the percent of helicopter should be drastically reduced if not eliminated." 108

"Helicopter yarding should be limited to only those places that definitely cannot be logged any other way. Multi-span, cold decks, etc., should be considered before helicopter." 137-281 283-289 292-293B

Forest Service Response:

During the Multi-Entry Layout Plan (MELP) process for CPOW, harvest units were planned within the normal, difficult, and isolated components of potential timber harvest areas, as scheduled by the Forest Plan (TLMP 1979, as amended). Logging systems were designed to minimize costs of logging and associated road construction, while meeting the TLMP as amended (1979) standards and guidelines and BMP's. Helicopter systems were recommended in two general situations: (1) it did not appear feasible to construct an access road or conduct cable yarding, or (2) while road access was feasible, the anticipated effects of road construction and cable-based logging did not appear to meet standards and guidelines and/or BMP's. During the 1992 field reconnaissance, 14 units planned for helicopter yarding were successfully accessed and designed for cable systems. Conversely two units planned for cable yarding were found to be more suitable for helicopter yarding. The FEIS presents an alternative (F4) in which no helicopter is proposed, and discloses the effects of helicopter logging in other alternatives.

1m: More wood to Coffman Cove and Thorne Bay

Letters and Comments on this Subject Included:

096 108 137-151 152-173 175-248 250-280 283-286 291 293 293B 297 299 300

Examples Include:

"Make more volume available to Thorne Bay." 096

"Make more volume available to Coffman Cove." 137-248 250-280 283-286 291 293-293B

"Make more volume available to Coffman Cove. They are an incorporated community and their economic stability and viability should be an important consideration." 297

"Not enough timber is designated for Coffman Cove area. This is supposed to be a 3-Year plan, minimum each year should be 30 million if not 40 million. In any alternative Coffman Cove would log from VCU 552 to VCU 584 west to VCU 577 and in an alternative, given this whole area you probably would only log 2 years." 300

Forest Service Response:

Chapter 3, Timber and Vegetation, displays long-term timber flows, as well as the volume proposed by each alternative to haul to each LTF. The TLMP Draft Revision has identifed more suitable available timber volume than the CPOW MELP (see the Timber section of Chapter 3). The Control Lake project listed in Appendix A of this FEIS also has volume which will likely be hauled to Coffman Cove and Thorne Bay. See also response to #7a, community stability.

1n. Second-growth management inadequately addressed

Letters and Comments on this Subject Included:

105 121

Examples Include:

"Second growth management will soon be one of the most important factors of Forest Management on the Ketchikan Area. It contributes viability to long term sustained yield, as well as important wildlife habitat benefits. We feel second growth management [pre-commercial thinning (PCT)] was not addressed adequately in the Draft EIS. The Final EIS should include summarized acres, identified as appropriate for pre-commercial thinning per Unit Cards. Concrete actions such as KV commitment should be taken to ensure that PCT, with its associated effects on timber production, habitat improvement, and community economic benefits, is accomplished. PCT projections should be included in the ROD." 105

"Second-growth management has not been considered--a one hundred year-old fast growing hemlock tree has little structural value. In the future, where will the resources be for piano, guitar, and boat woods?" 121

Forest Service Response:

The Alaska Region has developed a Silviculture Inventory System (SIS) to aid in the tracking and planning of second-growth management priorities and prescriptions. The ROD accompanying this document contains a Sale Area Improvement plan which identifies future thinning opportunities. These future opportunities, such as commercial and pre-commercial thinning, will be covered in subsequent environmental analyses, as units and prescriptions are identified. Old-growth harvesting is anticipated to be the primary source of timber for the coming 60-70 years. Though old-growth harvest will decline at that time, some old-growth harvest is anticipated over the entire planning horizon (150 years).

1o. LTF discussion and analysis are inadequate

Letters and Comments on this Subject Included:

115 134

Examples Include:

"A LTF will result in the discharge of significant amounts of woodwaste and other non-point source pollutants,....These discharges impact water quality and associated fish and wildlife habitats." 134

"...areas where the rip-rap and rock fills have been placed in the water to accommodate log transfer have enhanced the "marine bethnic habitat" and areas such as Calder Bay that have had a lot of log transfer activity in the past currently have no adverse effects from the log transfer." 115

Forest Service Response:

Discussions of the effects of Log Transfer Facilities (LTFs) are included in the Fisheries and Transportation and Facilities sections of Chapter 3. Monitoring of existing LTF sites started in 1991 and is ongoing. As more data from the monitoring is collected, further analysis of site-specific information can be used to analyze the impacts of log transfer at these sites. All LTF sites on the Ketchikan area are being evaluated for non-point source pollutant discharge systems. All sites will comply with the new Storm Water Discharge for Industrial Site requirements established in 1992.

1p. Continue use of BMP's for road construction/logging on case-by-case basis

Letters with Comments on this Subject Included:

137-151 152-173 175-252 255-289 291 293 293B 301

Examples Include:

"Instead of requiring specific numerical standards when referring to what will be permitted during road construction, logging, etc., the Forest Service should continue to use Best Management Practices so that appropriate techniques and procedures can be used on a case-by-case basis." 137-252 255-289 291 293-293B

"Road building using the Best Management Practices should be used and procedures evaluated on a case by case basis. The plan to protect water quality is necessary but it is necessary to give guidelines which can be used by the builders and regulators." 301

Forest Service Response:

BMP's will continue to be incorporated into road construction specifications to ensure that State water quality standards are met. This has proven to be one of the most effective measures to minimize adverse impacts to soil and water resources.

1q. More A-frame logging

Letters and Comments on this Subject Included:

285 286

Examples Include:

"Put up more A-frame logging." 285

"Put up more A-frame sales." 286

Forest Service Response:

This project adopted the standards and guidelines of Alternative P of the TLMP Draft Revision which do not permit timber harvest within the Beach Fringe area (all lands 500-feet slope distance inland from mean high tide). Although the adopted standards and guidelines do make allowances for limited breakouts

to accommodate A-frame logging immediately outside the beach fringe, the CPOW MELP did not identify any units for A-frame logging. There will be a limited number of small sales in the Sea Otter Sound area which have been designed for A-frame logging; however, it is likely that use of this logging system will be limited in future timber harvest plans.

1r. Access VCU's 552 & 553 from road 3030500, between Barnes Lake and Sweetwater Lake

Letters and Comments on this Subject Included:

300

Examples Include:

"...accessing VCU 552 & 553 via a road coming from 3030500 road system and crossing the chuck between Barnes Lake & Sweetwater Lake. This would provide recreation opportunities to access the lakes and have a low elevation road when eventually it ties into Whale Pass so that people don't have to travel to the middle of the island." 300

Forest Response:

The proposed route, although technically feasible, would require a bridge over the chuck between Barnes Lake and Sweetwater Lake and would not be economically feasible under this proposal. It was not incorporated in the MELP and is not discussed within the FEIS. In another project, the Federal Highway Administration is considering alternatives for extending the State highway to Whale Pass using a low elevation route; none of those alternatives considers the route proposed in this comment. The Forest Service Preferred Alternative for the project does not propose harvest within this area.

1s. Wildlife islands are hazardous and increase logging costs

Letters and Comments on this Subject Included:

KT2

Examples Include:

"This idea of leaving no cut islands inside of the clearcut. I don't know whoever thought this up sure as hell didn't know what he was talking about. There's very, very few places you could do it." KT2

Forest Service Response:

Wildlife islands, leave strips, and other forms of structural diversity left in units are an important component of ecosystem management. All forms of partial cuts--including wildlife islands (clumps of reserve trees), snag patches, shelterwood/seed tree harvests, and partial cuts to maintain visual quality or riparian integrity--will be designed through silvicultural prescriptions and logging system feasibility, which will include safety considerations. The timber appraisal for the offering area will evaluate whether increases in logging costs are justified. Although these silvicultural systems may increase logging costs, they do provide benefits to other resources, such as wildlife (increased travel corridors for deer, snags for cavity nesters, and habitat diversity for other species), fisheries (improved streamside buffers), timber (improved

regeneration and species diversity), and visuals (maintenance of visual quality objectives). These benefits are discussed in the appropriate resource section in Chapter 3.

1t. Regeneration concerns in low-volume stands

Letters and Comments on this Subject Included:

C8

Examples Include:

"It will be difficult to establish adequate regeneration on low volume areas." C8

Forest Service Response:

The National Forest Management Act (NFMA) requires the Forest Service to ensure that all harvested stands are fully stocked with appropriate species within five growing seasons after harvest. Certain low volume stands, especially those having northern and eastern exposures above 1,500 feet elevation, will be challenging to regenerate naturally. Some harvest units are prescribed for shelterwood or seed tree harvests to help establish regeneration on these difficult sites. Because of anticipated regeneration problems, specific units are identified for regeneration monitoring in the Timber section of Chapter 3 and the Mitigation & Monitoring section of Chapter 2. All harvested areas will be surveyed in the third and fifth year following harvest (Forest Service Silvicultural Handbook) to determine if supplemental planting is necessary to augment natural regeneration.

2. SUBSISTENCE

Public response to this issue focused on concern over diminishing the supply of subsistence resources, including deer, fish, personal use sawtimber, and other items used traditionally by Natives and other subsistence users. There was concern over competition from sport hunters, increased access into previously unroaded areas, and potential for displacement from traditionally used areas. There was a feeling that the analysis was too general, did not use the best information available, didn't make best use of public input, and that harvest should be transferred to other areas of less importance to subsistence users.

2a. Displacement from traditional areas.

Letters and Comments on this Subject Included:

007(19) 008 014 020 032 042 068 072(2) 081 100 101 102 121 122 302 H1 H3 C1 C2(2) C3 C3 C4 S2 S3 KT6 KT9 KT11

Examples Include:

"I live in Sitka, and do not use the areas under consideration for personal subsistence or income related purposes, so my comments will be general. People displaced from Central Prince of Wales may use my areas for hunting, fishing, gathering, or other purposes, and so there is most definitely a potential personal impact on me." 032

"The Klawock natives will be forced in the future to utilize CPOW since their own lands have been heavily harvested...The non-native Craig residents are already required to travel past Control Lake to hunt and this puts them squarely into the CPOW area. The residents of the north end of the island will also have to travel to the CPOW since the north end of the island has been extensively logged already." 121

"It forces the folks to go farther afield. For some folks, who maybe aren't Tongass, they would have to ask permission.... One of the elders...said one of the problems is now we are forced a lot of times to go in areas that aren't our traditional areas. And it's embarassing or difficult because we have to go to someone else, it feels like begging to ask if we can go use their area to hunt or fish." S3

Forest Service Response:

The Subsistence section of Chapter 3 displays traditional Native subsistence use areas, as well as the current areas of use by other communities. Maps with traditional subsistence deer hunting areas for each of the communities were analyzed and are available in the planning record. The analysis in Chapter 3 indicates there will be near-term displacement of subsistence users, particularly those communities and individuals who have traditionally used WAAs 1319, 1420, and 1421. This will affect the communities of Coffman Cove, Craig, Hollis, Hydaburg, Klawock, Thorne Bay, Whale Pass, and Wrangell.

2b. Important deer winter habitat near communities

Letters and Comments on this Subject Included:

007(19) 011 012 101 121 H1

Examples Include:

"The Forest Service should manage the forest around communities with respect to the community. A buffer of old growth should be preserved." 007

"The north shore of Neck Lake is one of the few unfragmented high value wildlife winter habitat areas remaining locally.... Whale Pass has requested preservation of this area in previous comment periods...." 012

"I am writing to voice my objections to any logging or road building on the west side of Neck Lake.... This is one of our area's main deer habitat areas. It is very important to the community's subsistence lifestyles.... Would like to see a halt to logging in my immediate area."

Forest Service Response:

Timber harvest will decrease the long-term habitat capability for Sitka black-tailed deer which may lead to a long-term decline in deer populations. The FEIS has taken two approaches to providing deer habitat. One approach is to defer timber harvest in specific areas, including those adjacent to communities, as identified by public comment. This scenario would maintain deer habitat in areas favored by the public and was applied in Alternative F6. The other approach was to provide deer habitat through minimization of forest fragmentation. This scenario would maintain overall deer habitat, but not necessarily in areas favored by the public. This approach was applied in Alternatives F2 and F4. The preferred alternative (F5) partially combined these approaches, minimizing forest fragmentation, as well as also avoiding harvest in some of the areas favored by the public. For a more detailed discussion of deer habitat capability distribution, see the Subsistence section of Chapter 3.

2c. Increased access (roads) will affect subsistence

Letters and Comments on this Subject Included:

003 020 042 060 074 076B 078 298 H3 K1 K2 KT4 KT5 WP1 C4

Examples Include:

"In regard to subsistence.... I'd like to suggest that roads which have been used for logging be left open after the unit is harvested to ensure access to the area for hunting and fishing and general recreation. These roads, when blocked by gates, missing bridges, or culverts or water bars, deny access to the elderly and physically challenged for whom subsistence is necessary." 074

"I believe that the logging roads help our subsistence by providing us access to places that we didn't have access to before." WP1

"I would like to see all logging roads not being used dug up and closed when not in use, and the ones in use bolted and locked at night. All logging roads invite hunters from all over to hunt the islands, and at night spotlighters kill deer and thin out the deer population...." 060

"The road system isn't helping our subsistence hunting at all, it's ruining it. So I myself would like to see the road systems all dug up and put to sleep. Eliminated." K1

Forest Service Response:

Increased access can have both positive and negative effects on subsistence use of the resources (see the Wildlife section of Chapter 3). Road management objectives have been established for all new roads, taking into consideration subsistence use, protection of fish and wildlife, and recreational uses (see Transportation section of Chapter 3). The ROD states which roads will be closed to motorized vehicles after timber harvest and the reasons for such closures. Road management objectives in the preferred alternative have been specifically designed to mitigate the effects of wildlife hunting pressure which are affected by improved road access. Road Management Objectives for the preferred alternative generally do not encourage public access in areas where there is a potential for overharvest of deer, marten, wolves, and black bear.

2d. Reconcile decline in deer populations with increased demand

Letters and Comments on this Subject Included:

007(19) 008 012 020 121 122 302 C1(2) S3 K2

Examples Include:

"Already community members agree that deer are not as plentiful here as they were 6 years ago and the canopy on cut areas hasn't closed yet. Taking all this into consideration, how could deer populations stay almost constant for the next 50 years as your projections suggest?" 012

"When planning for conservation and use of wildlife resources, the agency must figure in reasonable incremental increases in hunter demand." 020

"The DEIS incorrectly assumes that subsistence demand will not increase over time." 302

Forest Response:

Increased demand calculations for deer were not used in the DEIS because deer harvest trends in Game Management Unit (GMU) 2 (POW Island) have not increased with an increase in the general population (DEIS Figure 3-22). However, in response to public comments, future demand for deer is shown in the FEIS as increasing from current demand. Department of Labor statistics indicate a 1.69 to 1.84 percent increase per year in population for southern Alaska to the year 2000. The FEIS used a 1.8 percent annual increase in demand for deer through the year 2000, and a 1.5 percent annual increase in demand after 2000.

2e. Minimize restrictions on free-use sawlogs

Letters and Comments on this Subject Included:

012 101

Examples Include:

"The people of Whale Pass depend on the forest for saw logs under the free use program. These provide lumber to do the many building projects undertaken in a developing community. Mopping up all the small, easily accessible stands of good timber left in the area further decreases the availability of this very necessary subsistence use of the forest." 012

"Would also like to see a halt to logging in my immediate area as I use it for firewood, my free use wood and as a habitat for game animals." 101

Forest Service Response:

The Code of Federal Regulations (36 CFR 223.10) provides free use of green or dried National Forest System timber to Alaska settlers, miners, residents and prospectors under certain circumstances. It explicitly restricts the usage to personal consumption, and prohibits sale. There is no other regulation that grants the Forest Service the authority to allow free use to civic or non-Federal groups. The free-use program for the CPOW Project Area is administered by the Thorne Bay District Ranger. Increased public opportunities for free-use timber will be afforded by salvage use of cull logs from KPC sale area clean-up operations. New road construction will also open up new areas for roadside permits.

2f. TRUCS data not reliable

Letters and Comments on this Subject Included:

016 020 035 102 112 121 S1 S3 KT9 KT11

Examples Include:

"In your TRUCS study there have been areas that have been left out of the study, for example Saxman." 102

"The TRUCS survey was done on 1987-1988 and is now 4 years old. The status of communities the size of those that use the study area can and do drastically change over short times. The data used to evaluate the.activities may not necessarily reflect actual activity due to the cultural differences that exist within the communities." 035

"Overall the TRUCS data and Alaska State Department of Fish and Game data is not reliable data." 016

Forest Service Response:

The subsistence analysis does not rely solely on the TRUCS information. In addition to the TRUCS, subsistence hearings were conducted in eight local communities to ensure the CPOW analysis was performed using the best information available. Although the TRUCS was done in 1987-88, the information is continuously supplemented with ADF&G harvest data, additional surveys by ADF&G Subsistence Division, and subsistence hearings held in the communities.

Saxman was not left out of the TRUCS. The CPOW FEIS did not include Saxman in the final analysis because after review of all the data, it appeared that the community of Saxman did not have significant use in the CPOW Project Area. See Chapter 3, Subsistence, for further discussion.

2g. Protect subsistence use of fish

Letters and Comments on this Subject Included:

008 012 016 020 068 072 081 087 098 106 107 117 118 119 120 127 133 135
H1 H3 S2 S3 KT6 KT11 294

Examples Include:

"Subsistence uses will be restricted. Water quality and, inevitably, fisheries, will suffer, even though the plan erroneously states that there will be no impact (!) on fisheries. And all this is subsidized by the American taxpayer, of which I am one." 068

"Subsistence areas are decreased and eliminated for ... fishing, thus making survival difficult for folks who live off the land." 072

"The EIS is out of compliance with the NEPA process by offering such a large volume of timber for a short period of time - greatly affecting ... subsistence fish... 40CFR 1502.21 says that impacts which have catastrophic consequences must be included even 'if their probability of occurrence is low.'" 120

"The problem with the 'subsistence alternative' is that it focuses primarily on 'land-based subsistence', or what I assume is mostly deer hunting from the data. This plan ignores the importance of well documented subsistence fisheries..." 016

Forest Service Response:

Alternative 3 of the DEIS focused on land-based subsistence activities, mainly deer hunting, because with implementation of beach fringe, estuary fringe, stream buffers, and BMP's, the fish habitat capability models did not predict decreased habitat capability.

The Tongass Land Management Plan (TLMP) establishes management activity standards and guidelines that were developed to ensure that no loss of fish habitat occurs on National Forest System land. Unit

and road locations, legislated stream buffers, and Best Management Practices (BMP's) are designed to protect water quality and fish habitat from adverse effects.

The Clean Water Act requires development of a state process to identify agricultural, silvicultural (forest management), and other non-point sources of pollution and to set forth procedures and methods to control such sources [See 33 U.S.C. at 1328 (b)(f)-(k)]. Proper implementation of BMP's results in compliance with applicable water quality standards [See Nonpoint Source Controls and Water Quality Standards, EPA Water Quality Standards Handbook, Chapter 2 at 2 (August 19, 1987)]. The Forest Service Handbook, Soil and Water Conservation, states: "The reasonable implementation, application and monitoring of BMP's in effect achieve compliance with the intent of the Clean Water Act and State water quality standards" (FSH 2509.22 pp. 03-2). The State of Alaska water quality standards are discussed in the Water Resources and Fisheries sections of Chapter 3 in the FEIS.

The preferred alternative was designed to avoid impacts to areas identified for subsistence fishing. These areas include Sarkar, Eagle Creek, and Barnes Lake.

2h. Protect subsistence use of deer

Letters and Comments on this Subject Included:

007(19) 008 012 016 022 033 020 039 042 047 048 058(2) 068 072(2) 081 087 090 098 101 102 103 106 107 112 116-120 121 122 125 127 133 135 302 H1 H3 SC1 C2(2) C3 C4 S2 KT6

Examples Include:

"We will have no wildlife habitat for subsistence use..." 007

"Being a person that gathers a substantial amount of my yearly food supply through subsistence means, I also read the Forest Service's findings in that area as a doomsday edict for the residents in this community that practice the same. A significant reduction in the Sitka black-tailed deer population will bring increased pressure on those families, such as myself, that depend on venison as a staple part of their winter diet." 087

"Subsistence would be greatly affected by CPOW. Your own studies show that by 2004 - 41% drop in deer and a 75% decline in the long term." 117

Forest Service Response:

Under Section 810(d) of ANILCA, the Forest Service's responsibility is to comply with the procedural requirements of ANILCA and, having done so, may manage National Forest resources to best fulfill its mission. Procedural requirements are stated in Section 810(a)(b)(c) and include: evaluate effect of proposed action on subsistence use, consider the availablity of other lands to support the proposed action, seek alternative means to mitigate effects on subsistence use, notify approporiate agencies of proposed action, hold susbsistence hearings, determine that significant restriction of subsistence use is necessary, use only the minimal amount of land necessary for the proposed action, and take reasonable steps to ensure minimal adverse effects on subsistence use.

Deer habitat capability, as measured by the wildlife models, is expected to decrease because of habitat changes that have occurred as a result of clearcuts. However, habitat changes do not, in or by themselves, equal population changes. The FEIS analysis of the Sitka Black-tailed Deer Habitat Capability Model

determined that implementation of any of the action alternatives would result in a three percent or less reduction from current habitat capability. It is recognized that this may affect the subsistence resource. Mitigation measures may be used to reduce this impact. A possible mitigation measure would be to restrict deer hunting by non-subsistence hunters. See also response to #2b.

2i. Increased competition from sport hunting/fishing will hurt subsistence use

Letters and Comments on this Subject Included:

060 121 H3 C2(2) C3 S2 K1 K2

Examples Include:

"Furthermore, Ketchikan hunters take 30% of their deer from CPOW and 50% of their deer come from Prince of Wales." 121

"Your own data shows us over 30% of Ketchikan hunting residents hunt on Central Prince of Wales." C2

"You have to reduce the use for harvest by others such as Ketchikan residents or Saxman residents will no longer be able to go over to Central Prince of Wales because of this restriction." C2

Forest Service Response:

The ANILCA 810 evaluation determined that there may be a significant restriction of subsistence use of Sitka black-tailed deer for many of the communities on Prince of Wales Island (see Subsistence section of Chapter 3). As a result of loss of habitat capability from past harvesting, this possible restriction exists even in the No Action Alternatives. If, for whatever reason, it becomes necessary to restrict deer harvest on Prince of Wales Island (increased demand, continued loss of habitat capability due to timber harvest, a series of bad winters, etc.) non-resident and non-rural hunters would be restricted first (Ketchikan, Juneau, and out-of-state hunters). Because Ketchikan hunters have historically taken half their deer from Prince of Wales Island and approximately 30% from the WAA's within the Project Area, it is likely other hunting areas would receive increased pressure from the displaced Ketchikan sport hunters.

2j. Should go elsewhere for the timber volume

Letters and Comments on this Subject Included:

020 102 114 134 302 C3 C4 C8 TB4

Examples Include:

"In addition, we do not believe that the rationale for the selection of the project area and scheduling of this sale has been adequately discussed. Alternative project selection and scheduling are not discussed." 114

"I think personally that it would be nice to look at the whole area. And to spread the impact out over large areas. I think that in certain places on the Island that cutting has gone too much. There are a lot of areas that haven't been touched at all. And it would be a lot less impact to everyone if that could have been spread out more." C4

Forest Service Response:

Appendix A in the FEIS describes the reasons for scheduling timber harvest within the CPOW Project Area at this time. Futhermore, it concludes that to meet long-term sale volume commitments, almost all Management Areas containing LUD III and IV lands would have timber harvest entry by 2004. Appendix A also describes the need for approximately 290 MMBF in one or more offerings to assist in meeting contract requirements and discusses the subsistence resource in this context.

2k. Consider historical Native use areas

Letters and Comments on this Subject Included:

016 020 042 100 102 302 H1 H3 S1 S2 S3 KT11

Examples Include:

"The agency must protect the Native subsistence culture by protecting traditional sites." 020

"Overall description of subsistence uses and the cultural history of the project area is poor." 302

"A lot of the folks, especially the Tongass Tribe, had ancestral subsistence areas in the Prince of Wales Island on the east side there and specifically within the Project Area along the coast." S3

Forest Service Response:

The primary Native culture boundaries are displayed in Chapter 3 in the Cultural Resources section. Deer hunting intensity maps for each community were generated by the University of Alaska, Institute of Social and Economic Research. These maps showed the intensity and location of deer hunting activity within the Project Area for each community. Table 3-80 of the CPOW DEIS summarized the maps by showing the acres harvested or roaded within the areas used by each community and how that acreage varied by alternative. The maps are located in the CPOW planning record and are available for review upon request.

2L. Didn't use best data (including oral testimony); analysis is not site-specific

Letters and Comments on this Subject Included:

020 035 074 098 102 114 121 302 C2(2) S1 S2 S3 KT1 KT9 KT11

Examples Include:

"There is virtually no site specific exploration of important subsistence areas and potential effects to that.... The EIS uses extremely insensitive indicators of subsistence use when much better information is in fact available. The agency should use the most frequent and most reliable TRUCS subsistence hunting data instead of relying on the far more general areas ever hunted data. It should also utilize detailed subsistence information generated by the Alaska Division of Subsistence." KT9

"We find your subsistence analysis to be so general and non-specific to make it meaningless. Why haven't you used the Alaska State Division of Subsistence Profiles so that it could be more site specific?" C2

"I think that information on forest subsistence needs should be gathered from Coffman Cove and Naukati, where there are both logging families and non-logging families living a subsistence lifestyle. That information needs to be brought into this draft...." KT1

Forest Service Response:

Predictions of impacts to subsistence users are analyzed utilizing the best available data (deer habitat capability models, GIS, TRUCS, and ADF&G deer hunter surveys). Effects are displayed with maps, tables, graphs, and written text.

Subsistence uses and needs are discussed in detail in Chapter 3, Subsistence. Formal and informal meetings have been held with individuals, communities, and organizations during the EIS process to gain an understanding of subsistence concerns. These subsistence concerns were taken into consideration in the development of alternatives and analyses. Information gathered since the release of the DEIS (subsistence hearings and public comment) has been incorporated into the FEIS.

The University of Alaska, Institute of Social and Economic Research, provided the following in response to questions regarding the validity of TRUCS information:

> "I understand that you have received one or more comments that the DEIS does not include the most complete TRUCS GIS data on deer hunting areas. I based the maps I prepared on one of three sets of deer hunting areas mapped by rural hunters: areas ever used to hunt deer. The two other sets of deer hunting areas are: (1) areas currently most often used for deer hunting; and, (2) areas currently judged by hunters to be most reliable for deer hunting.... I chose not to incorporate the boundaries of the 'most often' and the 'most reliable' deer hunting areas in the maps because the boundaries closely match the boundaries of areas 'ever used' by more than 15 percent of community households. Therefore the information would be redundant and would confuse the map presentation. While the three sets of areas theoretically offer three different perspectives on deer hunting areas, in practice I have found that confining the analysis to the areas 'ever used' is easier to explain and visually represent."

See also response to Issue 2m.

2m. Road hunting for subsistence was overvalued

Letters and Comments on this Subject Included:

020 102 121 S2 S3 KT4 KT5

Examples Include:

"The agency relies on TRUCS maps showing areas ever used to hunt deer, and comes away from this general data with the idea that subsistence use equals road hunting and subsistence is spread throughout the area." 020

"...the building of logging roads...as the best way to enhance subsistence use opportunity is ludicrous..." KT4

"Your subsistence analysis shows only the road hunting use and does not address prolific areas of hunter success. In effect, road hunting and successful harvest areas are not necessarily one and the same." 121

Forest Service Response:

The TRUCS "Areas Ever Used for Deer Hunting by SE Alaska Subsistence Households" was only one source of information utilized for the subsistence analysis. (See response to #2L.) Table 3-67 in the DEIS displays the amount of subsistence foods harvested by communities utilizing the CPOW Project Area. The subsistence analysis concentrated on deer because that is the subsistence resource which would be most affected by the proposed project. Studies (Ellanna & Sherrod, Timber Management and Fish and Wildlife Utilization--Klawock) have shown that deer use patterns switch from boat-based to vehicle-based when a community obtains access to an extensive road system. The TRUCS study also showed high subsistence use adjacent to the road system.

2n. Missed Kupreanof and Petersburg for subsistence hearings

Letters and Comments on this Subject Included:

126

Examples Include:

"The City of Kupreanof requests that the Central Prince of Wales Plan process be suspended due to...the lack of a public hearing process for the citizens of Kupreanof and Petersburg which have been documented as having a history of subsistence use in Central Prince of Wales Study Area, and who stand to be significantly impacted by the CPOW Plan..." 126

Forest Service Response:

Section 810 (a)(2) of ANILCA requires the Federal agency to 'give notice, and hold, a hearing in the vicinity of the area involved.' Furthermore, Chapter 3 of the FEIS shows that Petersburg residents harvested 68 deer during 1987-90 in and around the Project Area, which is five percent of the total deer harvest by that community. This percentage is significantly less than other communities in the vicinity of the Project Area. Based on this analysis, it was decided not to hold subsistence hearings in Kupreanof and Petersburg. Residents of Petersburg and Kupreanof were afforded an opportunity to provide written comments in regards to the CPOW project.

2o. Inadequate consideration of public comment

Letters and Comments on this Subject Included:

H2 H3 H4 S2 K2 KT5 KT8

Examples Include:

"Another question that has been going in my mind is what happens to these public testimonies when the people come forward and give their opinions?" S2

"They're giving us this opportunity to testify on behalf of subsistence when nobody in the community has been educated to what it really is." H3

"I feel these hearings are largely useless from the point of view of subsistence users because it's done from the wrong end. It comes from the top down and we're given options to deal with." H2

"These hearings are held repeatedly but the input never seems to be heeded." KT5

Forest Service Response:

The Forest Service has carefully considered public comment, both written and oral. The public involvement process for the CPOW project is outlined in Chapter 1. It included scoping, scoping briefings, media releases, briefings with special interest groups, subsistence hearings, and public comment on the DEIS. All comments were analyzed and incorporated as appropriate.

2p. Misinterpretation of ANILCA

Letters and Comments on this Subject Included:

S1 H4

Examples Include:

"The Federal Subsistence Board and the State of Alaska have misinterpreted the term rural, in the Alaska National Interest Lands Conservation Act, ANILCA.... We believe that Title 8 of ANILCA is designed to protect and continue the culture of the Alaskan Native Tribes that reside in rural Alaska." S1

"This whole ANILCA 810 hearing process is very badly flawed because of the policy of the Bush administration and the Secretary of the Interior delegating their trust responsibility when it comes to subsistence to the Natives.... The whole process is fatally flawed until such time as the Secretary of Agriculture and Secretary of Interior comply with Title 8 of ANILCA." H4

Forest Service Response:

Changing the ANILCA 810 process is not within the scope of the Forest Service's authority. The Forest Service has complied with all aspects of ANILCA within its jurisdiction.

2q. Protect other subsistence resources

Letters and Comments on this Subject Included:

S1

Examples Include:

"Traditional hunting subsistence has also included utilizing all land mammals such as deer, moose, mountain goat, bear, black bear, wolves, all furbearing mammals, and virtually every animal that inhabits the region of the Natives. All birds are utilized for food or ornamental use. Forest and land products, all species of trees, and vegetation are utilized to enhance the quality of subsistence lifestyle." S1

Forest Service Response:

These items are recognized as important subsistence uses and are discussed in Chapter 3, Subsistence.

2r. Logging is harmful to subsistence use in beach areas

Letters and Comments on this Subject Included:

S1

Examples Include:

"And cutting close to the beach. On this logging is hazardous to our Native subsistence because we have the greens and all those other foods that are on the beach there. And dragging logs and everything through there has ruined a lot of places. You can't subsist there anymore." S1

Forest Service Response:

No units in CPOW have been proposed within 500 feet of the beach or within 1,000 feet of any estuary.

3. WILDLIFE

Public response on this issue focused on decline in wildlife populations and biodiversity, lack of a long-term wildlife conservation strategy, harvest of old growth "retention", and treatment of T&E species. Some respondents felt the analysis was not site specific enough, relied too much on the use of habitat capability models, and that the models were inherently flawed.

3a. Overall decline in wildlife populations and biodiversity

Letters and Comments on this Subject Included:

001 005 006 007(19) 008 009 010(2) 011 012 014 019 022 025 026 032 020 021 036 042 046(2) 048 050 051 052 056 058(2) 061 062 067 072(2) 081 082 084 089 090 091 092 102 106 107 110 112 114 117-120 121 122 125-128 131 133 134 302 H1 C2(2) C3 C4 SS1 S2 S3 K1 K2 KT4 KT5 KT6 KT8 KT9

Examples Include:

"The cumulative permanent losses in wildlife habitat capabilities over the rotation are represented in this DEIS by the following examples; brown creeper (97%), hairy woodpecker (94%), deer (75%), marten (72%), bald eagle (68%), black bear (66%), Vancouver Canada goose (65%), and otter (45%). When these losses are combined with a significant removal of commercially important old-growth in the adjacent FS project areas, along with similar or even more extensive cutting throughout the numerous private land holdings on Prince of Wales Island, it suggests a major reduction of biological diversity in this biogeographical province." 302

"The cumulative impacts of prior extensive harvest in the CPOW area have significantly reduced wildlife populations; the CPOW project would reduce them even more." 020

"Fish and wildlife are the most important natural resource of the Tongass, and I feel it is unacceptable to implement a plan that is so devastating to their population and habitat." 026

"...A clear picture emerges as to what the future for wildlife is on the island, and that picture is not pretty. A major reduction of biological diversity is before us." 121

Forest Service Response:

Declines in wildlife populations, as projected by habitat capability models, were somewhat overstated in the Draft EIS, due to errors in the way the models were run. This has been corrected in the Final EIS, but the analysis still shows that habitat capability will decrease as a result of past, current, and future timber harvests. Populations projected to decline include Management Indicator Species such as black-tailed deer, marten, hairy woodpecker, and brown creeper. The Wildlife section in Chapter 3 discusses the impacts on these species, and what it means for other species. The Old-growth and Biodiversity section discusses impacts to overall biodiversity in the Project Area.

3b. Fragmentation of old-growth wildlife habitat

Letters and comments on this Subject Included:

003 006 011 012 025 020 084 114 117-120 121-122 125 128 134 302 KT8

Examples Include:

"In addition to preserving previously designated wildlife retention areas...we repeat our request made during scoping that some particularly deserving larger areas not be logged or otherwise developed: ... (3) In selecting cutting units throughout the planning areas, those units located in unfragmented high-value habitat should have the highest priority for non-selection. This should be combined with a strategy which will forego roads that will increase fragmentation. (4) We request that all significant unfragmented blocks of habitat be listed in the EIS and be marked on the maps." 114

"The north shore of Neck Lake is one of the few unfragmented high value wildlife winter habitat areas remaining locally." 012

Forest Service Response:

The Preferred Alternative maintains blocks of old-growth habitat in the Barnes Lake-Mabel Creek, the Honker Divide, the Paul Young Creek, and the Neck Lake areas for the life of the CPOW project. Effects on these areas under other alternatives are displayed in the Wildlife and Biodiversity sections of Chapter 3.

3c. Protect swan wintering habitat

Letters and Comments on this Subject Included:

020 124 H1

Examples Include:

"Trumpeter Swans in Gold and Galligan and Sweetwater should be monitored several times a week if any harvest or road activity takes place during the period of Swan presence." 020

"Where is the baseline data for making accurate assessments of impacts to wildlife? What monitoring and inventory have been accomplished within the project area? The area is important for the Marbled Murrelet, Trumpeter Swan, Northern Goshawk and Sandhill Crane for example. Basic biological information on these species is lacking. Judgements and conclusions concerning wildlife, reflecting this lack of knowledge, cannot be made with accuracy." 124

"For deer, Trumpeter Swan, I enjoy them in my back yard and anything you do to that habitat is going to affect me. Deer, human, Trumpeter Swan, Goshawk -- any damage to that habitat will affect me, by being on the same island, even though I don't directly use it." H1

Forest Service Response:

Winter aerial swan surveys were completed in 1989, 1990, and 1991 to identify important swan wintering areas. A list has also been maintained that identifies all the locations, dates, and number of swans observed back to 1953. Important swan wintering areas within the CPOW Project Area have been identified, and project standards and guidelines have been established to protect them (see Chapter 2). The USFWS began a murrelet survey in 1990 that is still continuing, see response to Issues 3q. Goshawk telemetry surveys began in 1991 and are also continuing. Interim guidelines for goshawks and murrelets have been incorporated in the Final EIS. Sandhill cranes use the project area on a seasonal basis and are discussed in the Wildlife section of Chapter 3.

See also response to Issue 3p.

3d. Use a long-term wildlife conservation strategy (Viable Population Committee recommendations)

Letters and Comments on this Subject Included:

003 020 021 042 114 117 118 119 120 121 122

Examples Include:

"There is no mention of the Interagency Viable Population Committee's report and recommendations -- in any of its incarnations." 020

"Recommendations of the Interagency Viable Populations Committee Report should be fully incorporated into all alternatives in the EIS." 114

Forest Service Response:

There are different hypotheses as to the most suitable means of maintaining viable populations of wildlife. The interagency Viable Population (VPOP) Committee recommended establishment of Habitat Conservation Areas (HCA), consisting of large, unfragmented blocks of old growth; this strategy has lower risk for maintaining viability than other hypotheses. The Supplement for the Draft Forest Plan Revision did not recommend any LUD III or IV areas to serve as HCA's, but rather relied on established LUD I and II areas to serve the function of HCA's; this strategy has higher risk for maintaining viable populations.

The CPOW DEIS analyzed the Viable Population Committee's recommendations, which identified two large, unfragmented blocks of high value old-growth habitat within the Project Area, which the Committee felt were essential to the maintenance of long-term wildlife viability. One of these large blocks is the Honker Divide block and the other is near Staney Creek. Alternatives F2, F4, and F5 attempted to incorporate the VPOP Committee's recommendations into alternative development framework (see Chapter 2). Alternative F2 did not harvest timber in either of the blocks. Alternatives F4 and F5 were unable to meet the project's purpose and need while avoiding harvest within each block, so it was decided to select harvest units in the smaller Staney Creek block and leave the large Honker Divide block intact. The CPOW FEIS has also utilized the March 1993 Viable Population Committee's recommendations and has displayed the proposed old-growth HCA's. (See Chapter 3, Old-Growth and Biodiversity.)

3e. Don't cut timber identified by 1989-94 LTS EIS to provide old-growth habitat conditions

Letters and Comments on this Subject Included:

003 005 020 113 114 121 122 124 127 128 KT4 KT5 KT9

Examples Include:

"The previous plan, eight years ago, designated wildlife retention areas composed of old growth forest. All of these areas should remain uncut." 005

"The conservation strategy adopted by TLMP 79, utilized in the 84-89 LTS EIS, ratified in TLMP 86, used in the 89-94 LTS EIS, and still in force is the provision of wildlife retention acres in any logging project." 020

"All of the DEIS action alternatives propose initiating harvest of the previously designated old-growth retention which was originally intended, only eight years ago, as a permanent allocation necessary for maintaining wildlife values and multiple-use within the project area." 302

Forest Service Response:

The existing Forest Plan requires that NEPA timber projects identify and map areas which will be managed to provide old-growth habitat conditions. However, it clearly states that this identification is only valid for the life of the NEPA project and does not represent a permanent allocation. The 1989-94 LTS EIS identified more than 35,000 acres of old-growth forest within the CPOW Project Area to be managed to provide old-growth habitat conditions for the life of that project. Harvest within these formerly designated old-grwoth habitat areas is in compliance with land use allocations of the TLMP Draft Revision Alt P and is necessary to meet the purpose and need for the project. A majority of these acres will still remain unharvested under all alternatives in the CPOW project (see Chapter 2). The ROD for this project identifies and maps new areas to be managed to provide old-growth habitat conditions, which emphasizes new information regarding large unfragmented old-growth blocks. In addition, only 1,639 acres of 35,034 acres previously identified will be harvested. This amounts to less than five percent. Overall, the ROD identifies a total of 44,711 acres for retention, an increase of 9,677 acres (27.6 percent).

3f. Change otter/marten sustainable harvest rate from 40% and 80% to 20% and 40% respectively.

Letters and Comments on thls Subject Included:

020 302

Examples Include:

"Marten and otter modeling seem to rely on excessively high population replenishment numbers. More reasonable harvestable surpluses should be figured and used in modelling." 020

"The sustainable harvest rates for otter and marten used in the DEIS are too high. They appear to be based on TLMP Revision SDEIS rates with which we do not agree and which appear to have little supporting documentation.... We believe that an appropriate sustainable harvest rate for otters is 20% not 40%." 302

Forest Service Response:

These lower allowable harvest rates have been used in the CPOW FEIS analysis contained in the Wildlife section of Chapter 3.

3g. Add wolf to MIS list for CPOW

Letters and Comments on this Subject Included:

020 021

Examples Include:

"Because of its high public interest, an ongoing Forest Service wolf study on POW, and the extensive roading existing and planned for POW, wolf should be an MIS for this project." 020

"An evaluation of the effects of the alternatives on habitat for wolves in the planning area is conspicuously absent in the DEIS." 021

Forest Service Response:

The gray wolf has been added to the list of MIS species analyzed in the CPOW FEIS (see Wildlife section of Chapter 3).

3h. Provide for wildlife enhancement

Letters and Comments on this Subject Included:

026

Examples Include:

"Plan should consider past logging effects on this area and look to enhance the wildlife habitat of this area without any further devastation." 026

Forest Service Response:

Wildlife habitat improvement projects may be authorized and funded through K-V collections on timber sale offerings originating from the CPOW ROD. Projects are identified in the Sale Area Improvement (SAI) Plan contained in the ROD.

3i. Incorporate patch size effectiveness and road densities into wildlife models.

Letters and Comments on this Subject Included:

020 021 090 302 KT9

Examples Include:

"Patch size and the effects of road densities must be included in wildlife modeling." 020

"The patch size analysis needs to be taken one step further. The patch size effectiveness values assigned to the blocks delineated on figures 3-3 through 308 should be incorporated into the deer habitat capability model." 302

Forest Service Response:

In response to public comment, patch size effectiveness and road densities are incorporated in the wildlife models for the Final EIS (see the Wildlife section of Chapter 3).

3j. Less reliance on models; use more site-specific information and better discussion of effects on wildlife.

Letters and Comments on this Subject Included:

020 021 042 098 108 112 114 115 121 122 124 131 302 S3 KT1 KT9

Examples Include:

"There is a glaring lack of any site-specific work in CPOW wildlife planning. Rather there is an over-reliance on modeling. Project level planning must be site-specific. The size of the CPOW or any other project area does not permit any lessening of site-specificity. Where on the ground are the most important acres? Why

are they important? Where are the biological corridors? What effect will the landscape position of retention acres have? Where should habitat conservation areas be? Where are the volume class 6 and 7 acres?" 020

"The Forest Service apparently is relying on the unit cards to provide the site-specific information and analysis required by NEPA. However, many of the specialists' recommendations appear to be generic and only minimally site-specific. This lack of information precludes a meaningful, site-specific analysis of the impacts from this proposed project." 021

"Wildlife surveys should be conducted in the Project Area to locate nests and other important habitats. For birds, nesting surveys should be conducted during the prime nestings period for each of the individual species. Roads, camps, and harvest units, should be examined and designed to prevent impacts to or disturbance of important habitats of rare or uncommon species." 302

Forest Service Response:

Most of the site-specific unit surveys and unit reconnaissance was accomplished during the 1992 field season, and the information was included in the CPOW FEIS. The results of the 1992 survey and reconnaissance were incorporated into the various alternative frameworks (see Chapter 2).

The wildlife effects section has been improved since the draft in response to public comments. Units were field checked by archaeologists, cave specialists, wildlife biologists, fisheries biologists, logging systems engineers, and others. Although not every unit was field verified, units were rated by potential effects as to which should be checked first. For example: 100 percent of the units with a high potential for cultural resources were checked, units that potentially contained karst features were surveyed by the Karst Research Group, units in suspected goshawk territories were surveyed by wildlife biologists. Additional field verification will occur during final unit layout.

3k. Deer model is flawed and not recommended for use for decision making purposes.

Letters and Comments on this Subject Included:

108 115

Examples Include:

"I do not know what deer population model you used for your analysis of impacts to deer habitat. If it is the one that has been developed with the State of Alaska, it has a great many limitations and flaws and is not recommended for use for decision making purposes. The accuracy of the model is so poor that, even if it were used simply as a comparison between alternatives, numeric comparisons should be avoided and in place you should use 'greater or lesser' impact type of comparisons." 108, 115

Forest Service Response:

The most recent Habitat Capability Model for Sitka black-tailed deer (April 1992) was used for the CPOW FEIS analysis. The model is used to estimate long-term habitat changes, upon which the effects to deer are based. The model is limited in its predictive abilities, and this is acknowledged in the document. It is the best model available for the Tongass National Forest and provides sufficient information for the decision-maker to make a reasoned choice among the alternatives. If field verification indicates the need to adjust the models, such adjustments will be made. Furthermore, the deer model was not the sole information used in analyzing the effects on wildlife habitat.

3L. Provide maps of old-growth retention:

Letters and Comments on this Subject Included:

020 134 KT4

Examples Include:

"The Ketchikan Area made a great stride forward when it adopted the practice of mapping retention acres. This practice should be continued in CPOW and all other EIS's issued under the current TLMP. Otherwise there is a complete lack of accountability that could easily produce another 2,000 acre retention cutting disaster." 020

"The DEIS should identify previously allocated old-growth wildlife retention areas located in the project area. If any of these areas are to be harvested, reasons why these areas are no longer considered necessary for maintaining wildlife values should be presented." 134

"I would like to see an overlay of old growth rotation blocked mapped out by the Viable Population Interagency Committee." KT4

Forest Service Response:

Old-growth retention previously mapped for the 1989-94 LTS EIS was displayed in the Existing Condition Map which was included in the map packet accompaning the CPOW DEIS. The FEIS also displays this. The Record of Decision displays the areas that will be managed for old-growth habitat conditions for this EIS. See also response to #24. The Interagency Viable Population Committee recommendation is shown in the FEIS.

3m. Improve discussion of ADF&G Deer Population Objectives

Letters and Comments on this Subject Included:

302

Examples include:

"We are concerned that despite our request in the scoping process, ADF&G deer population objectives were not presented in the DEIS." 302

Forest Service Response:

ADF&G Population Objectives are listed for all of the WAA's in the Project Area. The effects of timber harvest on the population objectives are discussed in the Wildlife section of Chapter 3.

3n. Mitigation measures for snag islands - threshold for action is too low and corrective action is inadequate.

Letters and Comments on this Subject Included:

114 302

Examples Include:

"There is an obvious error in Wildlife Islands and Snag Patches, which allows 90% non-compliance before the threshold is triggered." 114

"The threshold for corrective action on snag patches is too low. As written, before the ranger is consulted, over 90% of reserved snags must be missing. Corrective action is also inadequate. After consultation the ranger should be required to take some action. For violations of this and other prescriptions that are not correctable, monetary penalties should probably be imposed on operators." 302

Forest Service Response:

The threshold was incorrectly written opposite to the intent; the threshold for corrective action is 10% non-compliance. This has been corrected in the FEIS. This monitoring is discussed in Chapter 2 under Implementation Monitoring; if monitoring determines that wildlife islands or snag patches do not exist, the District Ranger will deal with the situation on a case-by-case basis.

3o. Leaving wildlife islands should not be used as a mitigation measure; they increase fragmentation.

Letters and Comments on this Subject Included:

020 302

Examples Include:

"The agency lists one- to five-acre islands inside of clearcuts as a wildlife mitigation measure. Such a strategy may provide some diversity in the second growth stand, but from the point of view of wildlife increases fragmentation because the volume is usually made up elsewhere. This practice should not be described as a wildlife measure." 020

"In review of Page 2-38, the DFG disagrees that leaving 1 to 5 acre timber islands within 100 acre clearcuts is a mitigation measure for wildlife. We are unaware of any study or new perspectives or ecosystem management prescription that recommends such islands of timber. Such timber islands increase forest fragmentation, increase forest edge, and increase the likelihood of blowdown. A comparison analysis should assess single tree retention scattered throughout the clearcuts, rather than islands of timber." 302

Forest Service Response:

The value of leaving old-growth patches in large clearcuts offsets the effect of increased fragmentation as a of result having to harvest more timber elsewhere. Green tree patches in large clearcuts have been recommended by: Samson et al., "New Perspectives in Alaska Forest Management," at the 1991 North American Wildlife Conference in Edmonton, Alberta, Canada; Samson et al. (Forest Service biologists), D. Anderson R. Flynn, J. Schoen, and L. Shea (ADF&G biologists), and Dr. Jerry Franklin (Univ. of Washington), "Conservation of Rain Forests in Southeast Alaska: Report of a Working Group," 1989 North American Wildlife and Natural Resource Conference.

3p. Need better wildlife research and analysis; should include non-MIS species.

Letters and Comments on this Subject Included:

021 114 121 122 124 131 134 SS3 SKTN1 SKTN9

Examples Include:

"Lack of scientific information. Where is the baseline data for making accurate assessments of impacts to wildlife? What monitoring and inventory have been accomplished within the project area? The area is important for the marbled murrelet, trumpeter swan, northern goshawk and sandhill crane for example. Basic biological information on these species is lacking. Judgements and conclusions concerning wildlife, reflecting this lack of knowledge, cannot be made with accuracy." 124

Forest Service Response:

Wildlife research has complied baseline information which was used in the development of the predictive wildlife habitat capability models. New research information (see response to issue 3c), as it becomes available, is being used to update Forest Service standards and guidelines.

Through the concept of Management Indicator Species (MIS), the number of species that occurs within a planning area is reduced to a manageable set of species that collectively represents the complex of habitats, species, and associated management concerns. This allows land managers to integrate information about wildlife and fish resources into National Forest management, through the use of habitat suitability and capability models. These models are developed for each MIS to measure changes in habitat condition and to predict species responses to changing habitat quality. They present consistent evaluations of wildlife and fish resources throughout the planning process. For a detailed discussion of MIS, see Forest Service publication R10-TP-2, "Management Indicator Species for National Forest Lands in Alaska." For information on species that are of concern and not MIS, see Appendix B, the Biological Assessment. See also response to #3j.

3q. More goshawk and other bird surveys

Letters and Comments on this Subject Included:

124 134

Examples Include:

"What monitoring and inventory have been accomplished within the project area? The area is important for the Marbled Murrelet, Trumpeter Swan, Northern Goshawk and Sandhill Crane for example. Basic biological information on these species is lacking." 124

"We recommend continued monitoring of the Northern Goshawks in the project area, and prompt amendment of management guidelines as indicated by the findings." 134

Forest Service Response:

The Forest Service has conducted surveys and monitoring as funding and workforce allows. In 1991, a Sikes Act contract was awarded to ADF&G to inventory and study goshawks. Units that are within the areas surveyed in 1991 and 1992 by ADF&G are listed in the Biological Assessment in Appendix B. Four of the goshawks in the Sarkar Lakes area have been radio-tagged to help identify important habitats. Units were field checked in 1992 by various resource professionals; units in suspected goshawk territories were surveyed by wildlife biologists. See response to issue 3c for discussion of surveys on marbled murrelets and trumpeter swans. The information that is available is sufficient to permit the decision-maker to make a reasoned choice among the alternatives.

3r. Improve the biodiversity analysis and discussion

Letters and Comments on this Subject Included:

001 114 117 118 119 120 121 122 127 134 KT1

Examples Include:

"While biodiversity is given mention in the EIS, it has not been given consideration of any substance....The relationship of the Central Prince of Wales Plan to biodiversity, and its direct, indirect and cumulative impacts on same are completely undeveloped.... The central Prince of Wales EIS fails to address biodiversity, and many other issues, in a meaningful way which will contribute to informed decision making." 114

"In summary the EIS needs to but does not adequately address:...biological diversity." 117-120

"A major reduction of biological diversity is before us.... We suggest that a supplement to the EIS be drafted that will adequately present alternatives that address...biological diversity." 121

Forest Service Response:

Biological diversity is analyzed and addressed in Chapter 3, Old-growth and Biodiversity. The discussion has been expanded to discuss this topic in more detail.

3s. TES and Candidate Species

Letters and Comments on this Subject Included:

134

Examples Include:

"The Arctic Peregrine Falcon (Falco Peregrinius tundris) should be added to the list of threatened species that could occur in the area as a seasonal migrant.

"In light of the need for further status review of the Harlequin duck (Histrionicus histrionicus) and the Service's ongoing studies of the spotted frog (Rana pretiosa), we recommend these species be added to the Final EIS list of Category 2 candidate species.

"The Marbled Murrelet, Northern Goshawk, and Prince of Wales northern flying squirrel, Category 2 candidate species, are typically associated with old-growth forest habitat which provides one or more critical elements of their life requirements. The proposed actions would result in loss of old-growth forest habitat and likely have significant adverse impacts on these species on Prince of Wales Island.

"The DEIS states that no plant species known to occur in the area have been determined to be threatened, endangered, or sensitive. There are some Category 2 plant species that potentially occur in the project area, including Aster yukonensis, Calamagrates crossiglumis, Carex leticularis var. dolia and Montia bostockii. These and other plant species of concern should be reviewed and discussed." 134

Forest Service Response:

Threatened and Endangered and Category 2 Species are discussed in detail in the Biological Assessment (Appendix B). The Biological Assessment includes an evaluation on the endangered American Peregrine Falcon, Eskimo Curlew, humpback whale; the threatened Arctic Peregrine Falcon, Aleutian Canada Goose, and Steller sea lion; POW flying squirrel, Harlequin Duck, Marbled Murrelet, Queen Charlotte Goshawk, spotted frog; and the Category 2 Plants, *Aster yukonensis*, *Calamagrostis crassiglumis*, *Carex lenticularis* var. *dolia*, and *Montia bostockii*. Additions to the list of threatened species is the responsibility of the U.S. Fish and Wildlife Service.

3t. Exclude harvest of the beach fringe and estuary habitats for the calculation of the year 2140 habitat capability analysis.

Letters and Comments on this Subject Included:

302

Examples Include:

"It is consistent with the State's position on the TLMP SDEIS that timber harvest be precluded from the proposed Beach Fringe and Estuary LUD and consequently that Table 3-57 be reconstructed to reflect the maintenance of the Beach Fringe and Estuarine LUD throughout the rotation." 302

Forest Service Response:

Analysis of the year 2140 in the CPOW DEIS incorrectly assumed that Beach Fringe and Estuary LUD's would be harvested. This has been corrected in the CPOW FEIS. The IDT obtained the TLMP Draft Revision coverage and used the same assumptions for what will be harvested by the year 2140. When the models for 2140 based on those assumptions were re-run, the following habitat capability reductions occurred:

	FEIS	DEIS
Eagle	34%	68%
River Otter	23%	45%
Marten	56%	72%
Deer	61%	75%
Hairy Woodpecker	87%	94%
Brown Creeper	92%	97%
Black Bear	57%	66%

3u. Goshawk protection measures are excessive

Letters and Comments on this Subject Included:

115

Examples Include:

"The Goshawk protection measures outlined seem excessive. The 660 acre no-cut zone around each nest covers much more area than the 330 foot no-cut zone around Bald Eagle nests. Even so it totals 8 acres, not the 20-30 acres of no harvest outlined in your interim guidelines. The additional constraint of no more than 5% harvest of the adjacent 600 acres per decade seems unreasonable in a forest where such a small percentage of the old-growth timber has ever been harvested." 115

Forest Service Response:

Interim Goshawk Management Guidelines (dated August 18, 1992) have been developed for the Tongass National Forest. These guidelines will be followed until administrative studies and/or research indicate that a change in guidelines is warranted. Goshawks appear to have different habitat requirements than

eagles, hence management guidelines are not the same. Goshawk telemetry studies are underway and may result in changes in the interim guidelines.

3v. Protect wolf denning area

Letters and Comments on this Subject Included:

013

Examples Include:

"Please do not harvest unit 583-258. There is a significant wolf denning area adjacent to the unit...." 013

Forest Service Response:

Road construction and harvest activities may temporarily or permanently displace gray wolf use of this area for denning. The analysis of effects of wolves in Chapter 3 of the FEIS indicates that "gray wolves do not exhibit a preference for specific habitats or habitat characteristics (Paradiso and Nowak 1982). The presence and well being of gray wolves appears to be dependant on the availability of prey rather than land form, climate, or vegetation." Therefore, prey availability is more important than vegetation. Furthermore, the timber harvest unit is more than one quarter mile away from the denning area, and is separated by a stream which will not be crossed. A lake is adjacent to the denning area, and since the harvest unit is not between the denning area and the lake, access to the lake by the wolves will not be affected. Finally, road access to the unit will be from the southwest; since the denning area is on the northeast side of the unit, road construction should not have an impact. The Alaska Department of Fish & Game recommended some timing restrictions on road construction and timber harvesting which will mitigate this potential; all harvest and road construction activities are limited to the period July 1 to October 31 to avoid the denning period. Closure of this road after harvest was specified in the ROD. Several wolves in the area have been fitted with radio collars, so the effectiveness of the proposed mitigation measures can be monitored.

4. HONKER DIVIDE

There were two distinct schools of thought expressed in public comments regarding Honker Divide. One felt there should be little, if any, harvest and that the area would be better managed for wildlife, recreation, and biodiversity. The other school felt the area should be managed intensively for timber harvest, mostly with some restrictions to protect the proposed wild and scenic river corridor.

4a. Recreation, wildlife, and fishery values need protection

Letters and Comments on this Subject Included:

003 014 021 042 98 114 124 302

Examples Include:

"Honker Divide, extending from salt-water at the outlet of Barnes Lake to the Thorne River estuary, is exceptional in its importance both as high-value fish and wildlife habitat, and for outdoor-oriented recreational opportunities. The department formally requested the FS to set most of the Hatchery Creek and Thorne River drainage aside as an exceptional recreational area as early as 1962. In 1974 the department again proposed to the FS that Honker Divide be recommended for Scenic River Recreational Area classification. Consequently we are pleased that Honker Divide has recently been proposed by the FS for Wild and Scenic River status." 302

"We wish to say a special word about Honker Divide, which is an area we value most highly, and will treat it as a whole here even though a large part of it will be included in another timber plan. The area was proposed as a set-aside by ADF&G in 1962 and was proposed for wilderness designation by the Tongass Conservation Society in 1972. In 1977 it was included by SEACC in its original list of 45 areas meriting full protection and was also designated a "Class I - Gold Pin" sport fish system by ADF&G, one of only 19 such areas in all of Southeast Alaska. It is important swan habitat and supports the only moose population on Prince of Wales Island. And its low-lying, chain of lakes canoe route is a truly rare and valuable recreational asset." 114

"Having lived on POW for 5 years and spent considerable time within Honker Divide, I am perplexed by the continual 'picking away' at the drainage. Honker is exceptional in its importance for fish, wildlife and recreation. It would seem reasonable that an area such as this might be given the respect it so deserves. Timber harvest in Honker suggests the inability to provide a balance of uses on the Tongass." 124

"Honker Divide has been classified by the ADF&G as a "Class I gold Pin Watershed" which supports abundant fish and wildlife. Honker Divide will be severely impacted because of this timber sale." 098

Forest Service Response:

There will be effects on wildlife and recreation resources if the Honker Divide area is harvested. These effects are displayed in the FEIS. Two alternatives, including the preferred alternative, were structured to minimize harvest within this area. The ROD identifies this area as old-growth habitat "retention" to be maintained for the duration of this project. In addition, all alternatives protect the potential wild and scenic river corridor in Honker Divide to its highest eligibility classification. None of the alternatives in this project will change the eligibility rating for the river.

See also response to Issue 4b, 4e and 12.

4b. Visual quality along Canoe Route and Wild & Scenic corridor.

Letters with Comments on this Subject Included:

014 112 114 290

Examples Include:

"Viewsheds for the Honker Divide canoe route should be sensitive, and get a restrictive VQO." 020

"The Honker Divide is a magnificent scenic area that is widely used as recreation by many residents and non-residents. Cutting in this area is to the detriment of the scenic value and intrinsic value of the entire area." 290

"The Forest Service can plan and maintain recreational use along the Thorne River without interfering with timber harvest through scenic viewshed restrictions or any other type of restrictions." 115

Forest Service Response:

All alternatives meet recommended VQO's (see Visuals section of Chapter 3) which will ensure maintenance of visual quality of the Honker Divide canoe route viewsheds and to protect the eligibilty for Wild and Scenic River status. CPOW does not propose harvest within the proposed Wild and Scenic River corridor, which is 1/4 mile from the stream/lake bank. See also response to #4a and 12.

Views from the river along segment 2 (Scenic River LUD), from south of Sweetwater Lake to the Project Area boundary at Butterfly Lake, are primarily limited to the immediate foreground within the river corridor. It is the Forest Service objective that timber harvest activites would not be apparent from the river. However, harvest activities, both past and future, may be visable from the lakes along the canoe route in the middleground distance zone (1/2 mile or greater) outside the river corridor. Landscapes which are viewed from outside the river corridor and which are not of outstandingly remarkable value do not receive the same level of resource protection as those landscapes within the river corridor.

4c. Management focus for Honker Divide should be more recreational/visual.

Letters and Comments on this Subject Included:

003 014 019 020 021 098 114 121 124 125 131 281 291 KT4 KT5

Examples Include:

"Its low-lying, chain of lakes canoe route is a truly rare and valuable recreational asset. We believe this is an area of national significance and great regional ecological importance. We regret deeply that logging has already been done in this area, and ask that there be no more." 114

"I am perplexed by the continual 'picking away' at the drainage. Honker is exceptional in its importance for recreation. It would seem reasonable that an area such as this might be given the respect it so deserves. Timber harvest in Honker suggests the inability to provide a balance of uses on the Tongass." 124

"I'm requesting that the rest of the Honker divide drainage in this, in CPOW, be protected, as well as Sarkar and Sweetwater and Barnes Lake drainages from further cutting. I think it's important to recognize that their intrinsic values are more along the lines of recreation and subsistence than timber cutting." KT4

"Honker Divide should be managed for recreational opportunities and wildlife and fishery values only." 019

"No further cutting in Honker Divide." 125

Forest Service Response:

The TLMP (1979) as amended allocates Honker Divide to LUD III and IV, both of which permit timber harvest. The activities proposed by the CPOW alternatives conform to that plan. In addition, CPOW proposed activities are also consistent with the proposed standards and guidelines in Alternative P of the TLMP Draft Revision. These standards and guidelines are more restrictive than those in the existing TLMP. Under these more restrictive standards, Honker Divide is allocated to a variety of land use designations, i.e. Recreational and Scenic River, Modified Landscape, and Scenic Viewshed. All of these designations permit some degree of timber harvest (see #4e). In order to meet the purpose and need for the CPOW project, it is necessary to plan timber harvest in all areas of the Project Area where permitted by TLMP and the TLMP Draft Revision. The action alternatives propose various levels of harvest within Honker Divide. The preferred alternative minimized harvest within the Honker Divide large old-growth block.

4d. Honker Divide should be logged without restriction

Letters and Comments on this Subject Included:

069 115 292

Examples Include:

"The Forest Service can plan and maintain recreational use along the Thorne River without interfering with timber harvest through scenic viewshed restrictions or any other type of restrictions." 115

"One item that would be nice to see is the cost of leaving areas such as Honker Divide in a roadless state. These areas should run at a net profit to the U.S. govt. If you cost the recreational expense of canoe routes, trails and USFS recreation managers against the net income such areas contribute to the treasury I'm sure it will be a large negative. To do it right you will need to account for the potential stumpage dollars lost by managing in a roadless state. This will undoubtedly show the large negative drain wilderness, LUD 1 and 2, and other roadless areas are on the USFS and ultimately the treasury of the federal govt. If you American people could see a realistic portrayal of the expense of non-development, resources would be managed in a manner conducive to multiple use." 060

Forest Service Response:

See response to #4c.

4e. Honker Divide should be logged, with restrictions for protecting canoe route and scenic views

Letters and Comments on this Subject Included:

137-151 152-173 175-280 283-290 293B

Examples Include:

"Logging in the Honker Divide area should be permitted as long as the one half mile no-cut boundary along the canoe route is protected." 137-280 283-289 293B

"Logging in the Honker Divide area should be permitted as long as the one mile no-cut boundary along the canoe route is maintained." 288

"I prefer an alternative that would allow cutting but would provide additional buffer areas that would protect the view of the overall area". 290

Forest Service Response:

All alternatives meet Visual Quality Objectives (VQO's) established for Honker Divide which include retention and partial retention. See also response to #4a and #4c above. Further more, all alternatives maintain this area's eligibility for inclusion as a national Wild and Scenic River.

4f. Drop the Wild and Scenic River proposal for Honker Divide.

Letters and Comments on this Subject Included:

115

Examples Included:

"I am opposed to a "Wild and Scenic River" proposal for Honker Divide. "The 'no-more clause' in ANILCA prohibits the Forest Service from making such proposals." 115

Forest Service Response:

The CPOW project does not include any designation or recommendation for Wild and Scenic River status of any river. This is an issue which can only be addressed at the Forest Plan level, outside the scope of this document. However, all alternatives maintain the area's eligibility as a Wild and Scenic River to its highest classification.

5. FISH HABITAT AND WATER QUALITY

Many respondents were concerned with the adequacy of buffers on salmon streams and the potential for negative effects from timber harvest and road construction on fishery production, water quality, and soil stability.

5a. Stream buffers: adequacy, windfirmness, enforcement, past errors

Letters and Comments on this Subject Included:

003 014 016 017 020 021 048 056 061 081 082 087 090 098 102 110 112 121 128
131 302 303 551 552 KT2 KT3 KT4 KT5 KT8

Examples Include:

"It is questionable whether 100 ft. no-cut buffer strips along salmon-spawning streams and their tributaries will be maintained, as this has not consistently occurred in the past. Without this minimum protection, fisheries resources will obviously suffer." 014

"The Forest Service does not always comply with TTRA mandated protection measures. There are substantial problems with stream buffers being cut well within the 100-foot minumum. Where are these problems in CPOW? How widespread are they?" 020

"[concerned about]... the unit's [581-204] close proximity to Eagle Creek (the stream buffers do not seem adequate for this large of a class I stream)." 016

"Both Forest Service and ADF&G monitoring manifest a failure of the Forest Service to consider windfirmness in buffer design, with resulting blowdowns and buffer failures at some sites." 021

"What is vitally important now is to implement and enforce with teeth the 100 ft. no-cut buffer strips along both sides of salmon streams and their tributaries like it really mattered. Presently unenforced." 056

"We want to be informed as to how buffer strips will be protected and windthrow prevented by allowing for prevailing winds." 098

Forest Service Response:

The Tongass Timber Reform Act Section 103(e) specifies "...maintain a buffer zone of no less than 100 feet in width on each side of all Class I streams in the Tongass National Forest, and on those Class II streams which flow directly into a Class I stream, within which commercial timber harvesting shall be prohibited...." The Forest Service Handbook, Aquatic Habitat Management, FSH 2609.24, prescribes management practices for those streams not addressed by statute. FSH 2509.22 also prescribes stream and water protection for both TTRA and non-TTRA streams and other bodies of water.

Additional information on units which will require buffer strips has been added to the front of Appendix G, Unit Cards. Units near streams are listed and buffer prescriptions described. In addition, the Mitigation Measures Common to All Action Alternatives section in Chapter 2 discusses the stream buffering that will be done. Although permitted under TTRA, no yarding is planned across TTRA mandated buffer strips, and timber will be directionally felled away from stream buffers.

In a memo to District Rangers dated December 31, 1992, the Ketchikan Area Forest Supervisor directed that actions be taken immediately to ensure that all TTRA buffers meet the minimum 100-foot width, or the minimum width prescribed to meet the standards and guidelines for the streams when the buffer is greater than 100-feet in width. These actions include a quality control program to ensure accurate measurement of the minimum buffer width and length, statistically random sampling techniques to monitor the TTRA units, and finally, training personnel to fully implement TTRA. The District Ranger will be held accountable for proper implementation of TTRA requirements. Monitoring will focus on concerns about application and adequacy of buffer prescriptions.

5b. Soil and Water Quality

Letters and Comments on This Subject Included:

007(19) 017 030 020 021 036 064(2) 068 084 092 098 107 113 115 130 134 282 299 301 303 306

Examples Include:

"My major concern and interest in the Central Prince of Wales Project area lies in the cumulative impacts on water quality and anadromous fish habitat." 017

"The proposed harvest of 10,000 acres would result in increased siltation and reduced spawning acreage. It also seems probable that increased runoffs (resulting from the loss of ground cover) would contribute increased nutrients to the lake systems...which in turn would alter the eco-system." 064

"Our primary concerns are for the sale's impact on water quality.... Timber harvest and road construction will affect water quality. From reviewing the EIS we are unable to determine how the action alternatives will be consistent with the sediment standard. However, the responsibility is on the Forest Service to demonstrate in advance that timber harvest and road construction will not cause beneficial use impairment and cause standards exceedances.... The Final EIS needs to fully integrate #319 [of the Clean Water Act]. Existing water quality conditions in the National Environmental Policy Act documents need to reflect and reference the state's water quality assessment. Direct or indirect nonpoint source water quality effects need to be reduced through design and through mitigation measures to insure that the project is consistent with the state's NPS program....

"We suggest that the percentage of high mass movement index soils harvested in each value comparison unit (VCU) by alternative also be included in the final EIS.... We recommend that road construction through high landslide prone areas be avoided. As well as acres of road construction and watershed disturbance...the final EIS should discuss the effect of roads in the context of road density. Road density can be an indicator.... The text states that a CWE [cumulative watershed effects] analysis cannot be performed due to lack of data. The lack of data on existing watershed condition necessarily imposes an obligation to include a larger safety factor than might otherwise be used in selection and monitoring of BMPs." 306

Forest Service Response:

The Forest Service works cooperatively with the Alaska Department of Environmental Conservation (ADEC) under a Memorandum of Agreement (MOA) relative to BMP implementation and effectiveness. BMP's are the primary tool on the Tongass National Forest to prevent or mitigate adverse effects on water quality. The reasonable implementation, application, and monitoring of BMP's in effect achieves compliance with the intent of the Clean Water Act and State water quality standards (Forest Service Handbook, R10 Amendment 2509.22-91-1). Timber harvest and road construction activities in compliance with BMP's and monitored for effectiveness provide reasonable assurance that State water quality standards and Federal anti-degradation policy will be met. Continued monitoring and evaluation of BMP's will assure that water quality standards are being met. The monitoring plan for the CPOW Project Area is contained in Chapter 2 of this FEIS.

During the environmental analysis, the interdisciplinary team identified unstable areas using input (Soil Resource Inventory Maps, Geology Maps, Slope Maps) provided by various resource staffs. When slopes are classified as potentially unstable, a field investigation will be completed to obtain information to be used in a stability analysis. Where unstable areas are presently classified as suitable forest lands and management activities cannot be designed without causing long-term effects on soil and water resources,

they should be recommended for reclassification as unsuitable forest lands. Risk and potential effect of slope failure is discussed in the Soil and Water section of Chapter 3.

Road construction on very high mass movement index (MMI) soils is avoided whenever possible. Forest Service Handbook 2509.22, Soil and Water Conservation, R10 Amendment 2509.22-91-1, describes timber management and transportation planning to assure soil and water resource considerations. BMP 13.5 is designed to protect potentially unstable areas and avoid landslides; BMP 14.2 states that "roads, trails and LTF's will be located to avoid unstable, sensitive or fragile areas to the extent possible."

All alternatives meet the cumulative watershed effects threshold of disturbing less than 35 percent of the acres of third order or larger watersheds in less than a 15-year period.

5c. Effect of timber harvest on productivity of karst waters and fish production

Letters and Comments on this Subject Included:

020 309

Examples Include:

"The agency dodges the question -- and its responsibility -- when it denies knowledge of the effects of timber harvest on the aspects of karst waters that contribute to fish productivity." 020

"Salmon and trout have shown a better growth rate and more organics are available for the species within the creeks. If old-growth timber is cut, the geochemistry of the water changes, and many species will suffer." 098

"...what happens when logging activity raises or lowers the groundwater feeding into the carbonates? What happens when the volume of groundwater is increased because there is no longer a tree upper story system that captures and holds water? Does any of this activity change the pH of the carbonated ground water system? If it does, will this affect smolt production on streams coming out of the karst?" 121

Forest Service Response:

The karst ecosystem influences productivity of its aquatic habitats in several aspects. The geochemistry associated with karst development contributes to productivity in aquatic environments through its carbonate buffering capacity and carbon input dissolved from the limestone bedrock. This can have considerable downstream effects on the aquatic food chain and biotic community. Preliminary studies suggest that the aquatic habitats associated with the karst ecosystems support a richer biodiversity than the non-carbonate based systems, have higher growth rates for smolts and resident fish, reflect less variable water temperatures and flow regimes, and contain unique habitat affecting species distributions, abundance, and adaptations.

It is well documented that waters flowing through karst landscapes provide highly productive aquatic habitat (see Cave Resources section of Chapter 3). No specific information on the effects of timber harvest on the productivity of the aquatic habitat within the karst ecosystems of Southeastern Alaska has been gathered. Field observations of timber harvest and road construction suggest that flow regimes and sediment transport have been altered. Fragile formations now tannin stained and dissolving suggest that areas now flood that did not in the past. How these changes relate to the productivity of aquatic habitat is unknown. While this does constitute incomplete and unavailable information under 40 CFR 1502.22, it does not preclude a reasoned choice by the decision-maker among the alternatives.

The FY93 budget includes Ecosystem Management funding which will partly support research into the karst aquatic ecosystem. Standards and guidelines are included in this project to maintain vegetation around all direct drainages into caves and to protect cave entrances. Also, the Karst Evaluation panel will evaluate the adequacy of standards and guidelines, including those designed to maintain fishery production from karst aquatic ecosystems. See also responses to #8b and #8g.

5d. Refutation of "No Effect" or "Positive effect" from insufficient analysis, final should disclose true impacts on fish, that logging will damage fish resources.

Letters and Comments on this Subject Included:

003 009 010(2) 014 017 020 021 026 031 034 036 046 048 049 051 052 055 056 061 062 064(2) 068 070 072 075 080 082 081 084 086 090 098 102 107 112 113 115 117 118 119 120 121 128 129 130 131 133 135 294 306 309 C5 S1 S2 KT4 KT5 KT6 KT11

Examples Include:

"Cast aside this recurring fiction that huge logging operations have no effect on fishery values...." 081

"Water quality and, inevitably, fisheries, will suffer, even though the plan erroneously states that there will be no impact(!) on fisheries. And all this is subsidized by the American taxpayer, of which I am one." 068

"EPA believes that the proposed project could exceed WQS [water quality standards] so that the fisheries beneficial use will not be fully maintained...." 306

"I personally observed pink salmon fish kills on Staney Creek in 1987 and 1989. No matter what combination of factors caused the fish kills, it is apparent stream flow and temperature are essential factors. The Pentec Environmental study (1991) did not resolve the cumulative effects issue of timber harvest." 017

"Chapter 3, page 65 says that timber harvest to the stream bank is suspected of raising stream temperatures to a level which may contribute to adult fish kills. This is simply not true!" 115

Forest Service Response:

Timber harvest has the potential to decrease fisheries production through such negative effects as sedimentation (loss of spawning gravels), oxygen depletion, temperature change, and loss of sources of large woody debris. The Forest Service has developed an aggressive policy to minimize these effects through such practices as limiting the size of units and their location, designing roads away from streams and observing legislated minimum 100-foot width stream buffers, timing road construction activites in salmonid streams, specific standards and guidelines for Riparian Management Areas (RMA's), avoiding harvest activities on very high mass movement soils, implementing BMP's, and monitoring.

The Fisheries section of Chapter 3 has included an analysis of stream sections which may be susceptible to increased temperature and oxygen depletion as a result of past and proposed timber harvest.

5e. Community water supplies are at risk

Letters and Comments on this Subject Included:

006 014 020 026 048 054 058(2) 061 082 089 110 KT9

Examples Include:

"The agency (Forest Service) should not harvest in any watershed that is the source of drinking water for a community." 020

"I believe it is unacceptable to perform any logging in community watersheds." 026

"The Forest Service is threatening the domestic water supplies for Thorne Bay, Coffman Cove, and Whale Pass by logging in community watersheds." 061

Forest Service Response:

None of the proposed CPOW Project alternatives proposes locating timber harvest units or road construction in the watersheds which supply domestic water for the communities of Coffman Cove, Thorne Bay, or Whale Pass.

5f. Classify all unclassified streams

Letters and Comments on this Subject Included:

020 021

Examples Include:

"...the Forest Service fails to accurately identify stream classification." 020

"Where are the important fish streams? What are their problems or opportunities, if any?" 021

Forest Service Response:

The CPOW DEIS identified approximately 1,000 miles of potential streams within the Project Area which had been neither classified nor channel-typed. Between the DEIS and FEIS, these streams have been classified from the best available information by District Fisheries Biologists. Final mapped locations are pending until unit layout. These newly classified streams are not shown on maps, and proposed logging and transportation systems have not been redesigned to provide resource protection for these streams, but the proposed harvest acres, volumes, and environmental effects have been changed to reflect any TTRA buffers and other AHMU handbook standards and guidelines associated with them. Classification during unit layout will ensure that the appropriate stream and riparian protection measures are applied.

5g. Ensure CZMA compliance

Letters and Comments on this Subject Included:

021 303

Examples Include:

"...although the DEIS finds that all activities will satisfy the requirement under the Coastal Zone Management Act that activities affecting the coastal zone are consistent with approved state requirements, in this case the Alaska Forest Practices Act (AFPA), we must disagree." 021

"Our comments are intended to assist the U.S. Forest Service (USFS) in the preparation of a Final EIS that will be consistent with the Alaska Coastal Management Program (ACMP) and Section 319 of the Clean Water Act." 303

Forest Service Response:

In cooperation with Alaska Department of Environmental Coordination, implementation of BMP's is the mechanism used to provide compliance with CZMA. The CPOW project will be consistent with the State of Alaska's Coastal Management Program and Forest Practices Act to the maximum extent practicable.

5h. Provide site-specific identification of wetlands

Letters with Comments on this Subject Included:

021

Examples Include:

"While unit cards disclose how many acres of a proposed unit are on wetlands, any discussion regarding reasonable alternatives to locating proposed actions on wetlands is absent...Such analysis must be disclosed for the public to review." 021

Forest Service Response:

Executive Order 11990, as amended, requires Federal agencies exercising authority and leadership over Federal lands to avoid to the extent possible the long- and short-term adverse impacts associated with the destruction or modification of wetlands.

Wetlands within the CPOW Project Area are identified and described in the Soil and Water section of Chapter 3. In the process of planning timber harvest units, roads, and log transfer facilities, the factors which influence design and construction are taken into consideration and alternatives are evaluated. Factors which influence design and construction include the physical, biological and other values and functions of wetlands. Adverse impacts upon wetlands are avoided either by finding alternative locations for harvest units or facilities or by the application of mitigation measures which will reduce the adverse impacts. See Chapter 2 and Appendix G, Unit Cards. Suitablity of wetlands for timber harvest and road construction was analyzed during the development of the MELP for the project. The alternatives developed in this EIS represent reasonable alternatives to locating proposed actions on wetlands.

5i. Consider water pollution from KPC mill

Letters with Comments on this Subject Included:

021 114

Examples Include:

"No mention is made of the recently filed suit by EPA alleging serious water quality violations or the ongoing criminal investigation associated with those violations. Why was such information not included?" 021

"KPC PULP MILL POLLUTION SHOULD BE CONSIDERED A PROJECT IMPACT."(author's emphasis) 114

Forest Service Response:

The Soils and Water section of Chapter 3 includes a discussion of the indirect effects of the proposed action upon water quality in Ward Cove on Revillagigedo Island.

5j. Provide for stream enhancement.

Letters and Comments on this Subject Included:

040 048

Examples Include:

"My main concern is for Salmon Stream enhancement. In particular where possible fish ladders on streams that could serve that purpose." 040

"Fisher people pay for fisheries enhancement programs. I want the Forest Service DEIS to offer a management plan that produces and increases and secures the harvest amount of all fish." 048

Forest Service Response:

Enhancement projects are discussed in the FEIS, Chapter 3, Fisheries, Direct, Individual and Cumulative Effects, Fish Habitat section. The CPOW project analyzes the effects of alternative means of harvesting 290 MMBF of timber. It is not a management plan for the CPOW Project Area. Fish enhancement projects (other than Sale Area Betterment projects funded by K-V collections), campgrounds, boat ramps, and other projects will be analyzed in other environmental assessments. The ROD contains a list of fisheries enhancement opportunities as part of the Sale Area Improvement Plan.

5k. Implementing BMP's may not be sufficient to meet water quality standards

Letters with Comments on this Subject Included:

306

Examples Include:

"We are concerned that assuring that best management practices are implemented may not ensure that the Alaska Water Quality Standards (WQS) are being met. Water quality monitoring is required to ensure compliance with WQS." 306

Forest Service Response:

Best Management Practices (BMP's) are designed to meet and maintain State water quality standards. The Forest Service cooperatively works with the Alaska Department of Environmental Conservation (DEC) under a Memorandum of Agreement (MOA) relative to BMP implementation and effectiveness. BMP's are the primary tool on the Tongass National Forest to prevent or mitigate the adverse effects of logging activities on water quality.

The EPA, Water Quality Standards Handbook, 1983, states: "Proper installation, operation and maintenance of State approved BMP's are presumed to meet landowner's or manager's obligation for compliance with applicable water quality standards." The Forest Service states that reasonable implementation, application, and monitoring of BMP's in effect achieves compliance with the intent of the Clean Water Act and State water quality standards (Forest Service Handbook, R10 Amendment 2509.22-91-1).

The Forest Service position is that timber harvest and road construction activities controlled by BMP's and monitored for effectiveness will not exceed State water quality standards and will not violate Federal anti-degradation policy. Continued monitoring and evaluation of BMP's will assure that water quality standards are being met. The monitoring plan has been rewritten and strengthened in the FEIS for the CPOW Project Area (see Chapter 2).

The Ketchikan Area is in the process of developing a BMP effectiveness monitoring plan. The Area has developed a Water Quality Monitoring Proposal which would be implemented in cooperation with the Alaska Forest Association, State of Alaska DEC and the Ketchikan Pulp Company. The objective of this proposal is to do water quality criteria monitoring to measure the effectiveness of BMP design and implementation to achieve Alaska Water Quality Standards for sediment during road construction and timber harvest. Inputs and comments on this document can be made through Larry Meshew, Ketchikan Area Ecosystem Staff Officer.

6. VISUAL QUALITY

Many of the respondents felt clearcut harvest units were ugly and that extensive harvesting would decrease future recreation/tourism opportunities. A few felt that too much emphasis was placed on protection of visual quality.

6a. Concern for specific landscape viewing points or viewsheds.

Letters with Comments on this Subject Included:

007(19) 011 012 042 047 059 088 101 112 121 294

Examples Include:

"This is a first entry [unit 554.2-206] into a very sensitive area, and would be both visually and aesthetically objectionable to private land owners in Sarkar Cove". 112

"The visual impact of a logging operation should be based on how it looks from inside the cove [Sarkar], not from a mile to the west of the cove." 307

"It appears that this unit [549-205/206] would be visible from El Capitan Pass, a much used waterway. Drop." 112

"Unit 574-228 infringes on the visual qualities of the Thorne-Hatchery system and should not be considered for harvest. It may even be within the 1/4-mile corridor." 020

Forest Service Response:

Due to substantial public concern about cultural resources, caves, visuals, fisheries, recreation, and wildlife, Unit 554.2-206 is no longer being considered for harvest in this project.

Due to topographic and beach fringe vegetative screening, very little of Unit(s) 549-205/206 will be visible from the waterway and will meet the adopted Visual Quality Objective of Modification.

The upper portions of Unit 574-228, outside the 1/4 mile eligible river corridor but visible from the canoe route, have been deleted, resulting in a much smaller unit. This unit meets the adopted VQO of Partial Retention. Unit 571-238 is within the extended 1/2 mile corridor called for by the Honker Divide Management Plan incorporated by the existing Forest Plan. It is planned for selective harvest (uneven-aged management) to mitigate visual/recreation effects.

6b. Clearcuts are not visually attractive

Letters and Comments on this Subject Included:

002 007(19) 010(2) 011 019 020 042 045 047 051 059 063 072(2) 088 101 106 112 121 125 128 134 294 C5 KT6 KT9

Examples Include:

"Why do we have to have it (logging) where we look out of our windows every day and see the clearcuts. We have at least one area (in Whale Pass) that we see every day and boy is it ugly." 047

"Tourists do not care to come and see 'bare' hillsides--that's what they can easily see and observe in the States." 072

"I feel the proposed clear cut would lower the value of my property and greatly lessen the Alaskan experience my guests hope to enjoy." 088

Forest Service Response:

Clearcuts are not visually pleasing to everyone. This project has proposed a set of VQO's which emphasize scenic quality protection in key recreation areas such as Barnes Lake, Sweetwater Lake, and Honker Divide. These VQO's will allow moderate visual impacts along marine travel routes, such as the Alaska Marine Highway. Major visual impacts can be expected to continue along the road system within the Project Area. All the alternatives meet, and are consistent with, the Visual Quality Objectives (VQO's) proposed for this project.

6c. Loss of recreation and tourism opportunities

Letters and Comments on this Subject Included:

014 016 019 020 036 045 048 052 059 063 072(2) 088 092 093 101 106 107 112 116-120 121 122 128 131 135 294 C2(2) KT4 KT5 KT6 KT9

Examples Include:

"Rather than protecting primitive and semiprimitive opportunities, the CPOW DEIS destroys them." 020

"We encourage the Forest Service to look at recreation/tourism as a sustainable alternative to clear cut logging operations." 045

"If we continue to harvest prime recreation areas we will not only destroy the recreation opportunity but also the chance to enhance local economies." 128

Forest Service Response:

For the Thorne Bay Ranger District, Forest Plan direction is to maintain the primitive and semi-primitive recreational experiences in the Sarkar Lakes area, the Calder/Holbrook area, the Maurelle Islands and Karta Wilderness, the Salmon Bay area, and the Outer Islands. Of these areas, only the Sarkar Lakes Ptimitive Recreation area is immediately adjacent to the Project Area.

As noted on page 3-172 of the DEIS, six large areas represent the bulk of the acres (29 percent) presently classified as Semi-Primitive Non-Motorized (SPNM) or unroaded. These six areas are: (1) Trumpter Lake, (2) Baird Peak, (3) Manty Mountain-Slide Creek, (4) Paul Young Creek, (5) Kogish Mountain, and (6) Barnes Lake-Whale Pass-Mable Creek area. Current TLMP (1979) direction is to to allocate these areas to timber harvest, either with emphasis on commodity outputs or on a mix of commodity and amenity values. Though the CPOW alternatives differ in their protection of the semi-primitive character of these areas, full implementation of the TLMP (1979) as amended, will result in these areas moving toward the roaded and developed end of the spectrum.

Management direction for the Honker Divide canoe route is to maintain scenic values as seen from the canoe route. This route is located in the CPOW Project Area north of Butterfly Lake and is presently inventoried as Roaded Modified, due to the current level of roading and timber harvest. Most of this portion of the canoe route (from Barnes Lake to just north of Hatchery Lake) is recommended for Recreation River status in the TLMP Revision Alt P. The portion from just north of Hatchery Lkae to the Project Area boundary and beyond is recommended for Scenic River status.

The FEIS includes an expanded discussion of present tourism on Prince of Wales Island, future opportunities for tourism, and the potential impacts of the proposed harvest on these tourism activities. See also response to #7b.

6d. Fully discuss Visual Quality Objective's (VQO's) and impacts on scenic quality.

Letters and Comments on this Subject Included:

020 121 299 KT1

Examples Include:

"Visual Quality Objectives (VQO's) are tiered to TLMP SDEIS, and 'established' by adjustment to local conditions. This is totally improper." 020

"Sensitivity levels and scenic quality analysis inadequate." 020

"Your VQO's have been lowered in this plan and they do not address how these lowered standards will affect tourism. In fact, some VQO's are calling for maximum modification which is in direct collision with the aesthetics tourists demand." 121

Forest Service Response:

The current land management plan, TLMP as amended, does not give site-specific Visual Quality Objective (VQO) viewshed direction for the CPOW Project Area. Although VQO's were part of the TLMP (1979) direction, they were not based on any formal inventory (Analysis of the Management Situation, 1990, pg 3-525). This EIS is proposing for the Project Area a set of VQO's whereby scenic quality values will be emphasized from specific marine travel routes and saltwater use areas, as well as from specific recreational use areas. The VQO's adopted with this FEIS are consistent with the VQO's proposed for the land-use designations in the TLMP Draft Revision Alt P.

A visual resource inventory was completed for the Ketchikan Administrative Area in 1988 (Short 1992). This inventory mapped sensitivity levels, existing visual condition, landscape variety classes, distance zones, and inventoried VQO's using the Visual Management System developed by the Forest Service in 1974. These maps are available at the Supervisor's Office in Ketchikan, and are a part of the CPOW FEIS planning record as well. The methodology for determining "Class A or distinctive" landscapes (variety class) or sensitivity levels is contained in Forest Service Handbook #462 "National Forest Landscape Management", Volume 2, Chapter 1. Also, see Chapter 3 of the CPOW FEIS, Visual Resources. The Visuals section of Chapter 3 analyzes impacts to specific viewsheds, including a comparison of the inventoried and proposed VQO's for these viewsheds.

6e. Do not cut extended rotation.

Letters and Comments on this Subject Included:

020 128

Examples Include:

"Extended rotation is a visual prescription and should not be cut". 020

"Many harvested areas call for extended rotations". 128

Forest Service Response:

In past projects, extended rotation was intended to provide for the management of visually sensitive areas. This was to be accomplished by lowering the rate of harvest by increasing the length of timber harvest cycles. Rotation lengths in sensitive visual areas were extended from 100 years to 120 years in LUD IV areas and to 200 years in LUD III areas. Harvest within these formerly designated extended rotation areas is in compliance with TLMP direction and is also necessary to meet the purpose and need for the project. The CPOW project manages visual quality through establishment of VQO's and ensures all harvest units are in compliance with same. All proposed harvest units for this project have been determined to meet the proposed VQO's.

6f. Fully discuss recreation use and impacts

Letters and Comments on this Subject Included:

020 021 093 098 106 121 128 129

Examples Include:

"There is virtually no cumulative impacts assessment for the recreational resource. There must be. ...It should also consider the economic impact of recreation, which may be substantial. The cumulative effects analysis as presented in the DEIS is insufficient for informed decisionmaking." 020

"The DEIS claims that roaded recreation is more popular based on a limited, unpublished, survey of Prince of Wales residents. The Forest Service must disclose this survey in order for the public to determine whether the questions asked, and pool of respondents questioned, were biased or not." 021

"The Forest Service has never taken into account the cost to the environment, subsistence hunting and fishing, and the lessening of visual quality to residents and visitors." 098

Forest Service Response:

The FEIS expands the cumulative impacts analysis to include discussion of past trends on Prince of Wales Island, and the impacts of Native harvest. It displays the likely long-term impacts to the balance of ROS classes within the Project Area, and on the rest of Prince of Wales Island given the planned harvest from neighboring timber sales to the north and south of the CPOW project.

The Recreation section expands the discussion of tourism on Prince of Wales Island as noted above.

The survey referred to in comment 021 is part of a document called "Priority List of Recreation Development Projects for Prince of Wales and Associated Islands." The survey asked residents in all Prince of Wales communities to express their thoughts on a long list of recreational development projects, including trails off the road system, more remote trails, campground and day use site development, cabin and shelter projects, and cave related projects. They were also asked to add projects to the list that they thought were important. Highest support was given to construction of such road-based developments as a campground in the Maybeso-Harris River area, to several trails, including an alpine trail off the Polk Inlet road system, and an expansion of the Eagles Nest boardwalk. Also, surveys in Ketchikan (Ketchikan Community Survey) and testimony by many Ketchikan residents at public meetings have expressed strong desire for more roaded recreation opportunities. The survey is in the Planning Record and available to the public.

The FEIS does not contend that the public generally prefers roaded recreation opportunities. It only points out that, based on the cited surveys, a relatively lage segment of the area's population is looking for more roaded recreation opportunities.

A more detailed discussion of the recreation impacts of units in the Sarkar Cove area, units near Staney Creek, a unit along Eagle Creek, and units in the Salt Chuck mine area is included in the FEIS.

6g. DEIS does not identify eligible rivers (Paul Young, Mabel Creek) for Wild and Scenic River status

Letters and Comments on this Subject Included:

020

Examples Include:

"'The Thorne River-Hatchery Creek system is the only watercourse in the CPOW Project Area eligible for inclusion in the Wild and Scenic River system.' DEIS at 3-166. This is not true. Requirements for eligibility are free-flowing character and one 'outstandingly remarkable' characteristic. Other rivers such as Mabel Creek and Paul Young Creek are eligible, and the agency must do some inventory and analysis in this regard. The TLMP SDEIS cannot be tiered to as the source of any and all such analysis. Because of its high value as a wildlife corridor, Mabel Creek should be declared eligible and evaluated for suitability for inclusion in the Wild and Scenic River system. So should Paul Young Creek. The evaluation of Sarkar is ongoing." 020

Forest Service Response:

The TLMP Draft Revision analysis of the eligibility of various rivers for inclusion into the wild, scenic, recreational river system determined that the systems in question possessed no "outstandingly remarkable" value that was unique or exceptional compared to other rivers in the geographic area studied. The wild,

scenic, and recreational river analysis done for the TLMP Draft Revision was a comprehensive Forest-wide assessment by geographic area. It has identified a representative set of river segments eligible for inclusion into·the system and has categorized them into their appropriate level of classification is beyond the scope of this EIS to determine eligibility for inclusion in the wild, scenic, recreational river system. The TLMP Draft Revision and Supplement had a total of 9 months of public comment period where anyone could comment on the river eligibility determinations. The preferred alternative does not propose timber harvest in the Paul Young Creek or Mabel Creek areas.

6h. Road design should take recreation use into account

Letters and Comments on this Subject Included:

021 112 128 KT2

Comments Include:

"The DEIS (at 3-162) reaches the conclusion that recreation use on the island has increased because of the increased access provided by the expanding road system. Such a conclusion is unsupported by analysis conducted by the Supervisory Civil Engineer for the Ketchikan Area." 021

"The much-promoted idea that road-oriented tourism will be a major industry on Prince of Wales Island runs headlong into reality when you consider the overwhelming desire of tourists to see 'scenery, forest, mountains, out of doors' and 'wilderness, unspoiled, rugged views. Not much of that will be left in CPOW or on the island, and there is little else to promote except for thousands of miles of logging road, hundreds of rock pits, and a mind-boggling plethora of clear cuts." 112

"My second concern regards recreation. I have lived on Prince of Wales Island since 1987 and each year I've seen more prime recreation areas destroyed by logging and road building. I do not agree that the roads being built on Prince of Wales Island provide the access or opportunity to develop high quality recreation areas. In fact, well over the majority of roads are extremely dangerous for recreators and tourists; they have been designed and layed out for the sole purpose of harvesting timber." 128

"If you go out to Prince of Wales today, there's several hundred miles of road that's wonderful road, but, if it's raining, you can't get to it." KT2

Forest Service Response:

Roads constructed for timber sale use can be built only to the standard required for the harvest of timber (36 CFR Section 223.38). All new road construction proposed for the CPOW project is designed for the primary purpose of timber transport and not for recreation, unless specifically designated for that purpose in the Record of Decision (ROD). Additional recreation funds would be required to construct the road to higher standards to accomodate recreational traffic. These supplemental funds would be used to cover the extra costs incurred from building the road to a higher standard than is required for timber access and hauling. Many of the logging roads, including some of the main arterial roads, do pose some hazards for the average recreation driver, particularly when logging activity is going on in a certain area. The road system has been gradually upgraded by the State of Alaska. The road just north of Thorne Bay along the east shore of Prince of Wales Island has recently been upgraded and the road north toward Naukati is presently being widened. As these and other roads are gradually improved in the future, it is expected more of the public will be attracted to the roaded recreation opportunities available throughout the island. All roads in the CPOW ROD will have Road Management Objectives completed which will outline the road management strategy. This strategy will reflect the needs for recreation use.

6i. There is too much emphasis on visual and scenic quality.

Letters and Comments on this Subject Included:

042 115 299 TB4 KT1 KT2

Examples Include:

"It is unnecessary to protect the 'viewsheds' for people who are doing the timber harvest and the areas that are 'viewsheds' from the roads built by the industry to access timber harvest areas should not be constrained by visual concerns.... Many areas along the roadside would have no view at all if the timber had not been removed to allow people to see more than a few feet beyond the road clearing." 115

"...you can't see anything in the forest unless the forest is cut down somewhat". KT2

"Visual guidelines need to be changed, as visuals are an opinion and not a fact. They are based on a person's idea of how something looks and not as to whether it has a negative or positive effect to the area. Facts and not opinions need to be used in making these decisions." 299

"...a great lengthy write up occurs in there [CPOW DEIS] on visuals and I think that...the Forest Service should do a study on what local preference is on visuals, rather than using national standards". SKTN1

Forest Service Response:

Because there are no use restrictions on open roads in the National Forest System, anyone--tourist, logger, fisherman or hunter--may use these access corridors. Diversity of road user types, frequency of use, and distance and variety class of the landscape determine visual sensitivity. In the CPOW Project Area, VQO's are proposed as seen from management-determined "Visual Priority Travel Routes" (see Chapter 4, Volume I).

Visual or scenic quality was raised as a significant issue during the initial public and internal scoping processes for this project, and during public comment on the CPOW Draft EIS, and thus warrants analysis in this document. It is apparent from these comments that scenic quality of the Project Area is important to the recreation experience and tourism industry.

7. LONG-TERM ECONOMIC AND SOCIAL STABILITY

There was substantial public comment on this general topic. Many felt the solution to long-term community stability lay in curtailing harvest within the Project Area to what they considered to be sustainable levels and attempting to diversify the economy. Others felt they would be better served by harvesting more timber now and in the immediate future, without concern for the long-term future. There was also concern about future timber supplies for small operators after the conclusion of the long-term contract.

Because of the extent of the public comment, this will be treated as a significant issue for the CPOW FEIS, in combination with #17.

7a. Consider community stability, long-term economic factors, effects on jobs

Letters and Comments on this Subject Included:

002 003 005 006 007 008 009 010 011 012 013 014 016 019 026 030 031 032 020 034 036 037 041 046 048 049 052 053 054 055 056 058 061 062 063 064 068 070 071 077 078 079 080 081 082 084 085 086 087 089 091 096 098 108 109 110 112 115 116-120 121 122 125-129 133 135 137-151 152-173 175-289 291-294 296 299 301 302 293B H2 C2 C6 C8 TB3 KT1 KT4 KT5 KT8 KT9

Examples Include:

"*In summary, the PROTECTION AND HEALTH OF THE FOREST, WILDLIFE, WATERSHED, FISHERIES AND THE SUSTAINED ECONOMIC HEALTH OF THE LOCAL PEOPLE IS MORE IMPORTANT THAN SHORT TERM PROFITS FOR THE KETCHIKAN PULP MILL.*" *(respondent's emphasis) 062*

"*In order to better maintain wildlife values, provide more long term jobs, and protect future community stability within the project area, the FS would have to consider a more moderate, but immediate, lowering of the annual harvest level, rather than waiting until 2004.*" *302*

"*The long-term economic viability of this island was not considered in your plan, is part of the continuation of communities on this island, and is just one of the many ways the EIS process was flawed.*" *106*

"*I am concerned that the Forest Service has not placed enough emphasis on community stability. I feel the communities of Thorne Bay, Naukati, and Coffman Cove need to have a stable base on which to grow. Therefore efforts must be made to keep timber available for each of these communities.*" *108*

"*I feel it is important to clearly display the reduction in timber employment associated with the CPOW and adjacent project areas, after the implementation of the timber schedule shown in Appendix A. The long-term contract was established in 1951 to provide (among other things) community stability for SE Alaska. I find it contradictory that continued execution of this contract may have a negative impact on long term community stability within SE Alaska.*" *013*

"*Long term social and economic studies of Prince of Wales Island and the areas involved need to be covered and these need to be considered on equal level.*" *C1*

"*I disagree with the statement that "it is vitally important for the USFS to include community stability and viability as one of the most critical factors to consider and not downplay it as the DEIS does.*" *290*

Forest Service Response:

Of the 374 respondents to the CPOW DEIS, 243 individuals expressed concern about long-term economic and social stability of local communities. In most cases, this issue was related to concern about the long-term capability of the Project Area to provide a sustained flow of timber and other resources. These two concerns have been combined in the CPOW FEIS and fully analyzed as a significant issue under "Long-term social and economic stability of local communities." The focus of this issue is the capability of the Project Area to provide a long-term sustained flow of timber and other resources and whether the level of outputs is sufficient to meet the needs of local dependent communities.

Local communities depend on timber and other natural resources from the Project Area to support stable economies and lifestyles. The Socio-economics section of Chapter 3 displays the effects of the proposed and reasonably foreseeable actions on long-term employment trends including jobs in: logging; log transport; road construction; wood processing; precommercial thinning; commercial fishing; guiding and charter services to hunters, fishermen, hunters, kayakers and cavers; and providing goods and services to tourists.

Local communities also depend on the Project Area to provide subsistence resources and outdoor recreation opportunities to support their lifestyles. The Subsistence and Recreation sections of Chapter 3 analyze the effects of the proposed and reasonably foreseeable actions on the availability and distribution of subsistence resources and recreation opportunities.

The Forest Service supports local economies whenever possible, even though historic levels of support and timber harvest may not be able to be maintained in the future on a localized basis. The Forest Service will contribute to stability of local communities in the future after completion of the long-term contract. The Socio-economic section of Chapter 3 discusses proposals by the USDA to fund rural development projects within timber-dependent communities.

As a result of extensive public comment, community stability has been included as a significant issue (see Chapter 1) by which all alternatives are analyzed and compared (see Chapter 2). The Socio-Economic section of Chapter 3 has also been improved and strengthened (including display of timber employment). See also response to #17a, b.

7b. Diversified future economy

Letters and Comments on this Subject Included:

007 008 010 011 012 020 037 042 045 063 072 086 097 101 106 117-120 121 128 129 290 H2 C2 KT3 KT4 KT5 KT8

Examples Include:

"To be able to survive here, we and our children will need a diversified economy with income from tourism, charter operations, logging and fishing, as well as the opportunity to live a subsistence lifestyle." 007 (19 signatures)

"With CPOW the Forest Service is consciously planning the economic demise of Prince of Wales Island. It is planning the demise of the timber economy and failing to plan for any compensating economic viability of other forest resources such as tourism, subsistence, sport fishing, personal use hunting, or a different timber economy based on smaller operations." 020

"It would not bother me a bit if the Forest Service stuck to the DEIS in formulating allowable cutting areas. We simply do not need to be dependent on one business (KPC) that monopoli(zes) an entire industry in S.E.·as well as monopoli(zes) the entire forestry bureaucracy." 290

Forest Service Response:

The land use allocations of TLMP as amended (1979) offers a better forum to analyze how the Forest Service can best affect the future economy of Prince of Wales Island. However, it is the conclusion of the TLMP Draft Revision that the Project Area will be able to maintain its historic and current level of timber harvest and timber-related employment over the long term (see Chapter 3, Timber and Vegetation). The Socio-economic section of Chapter 3 has been expanded to reflect estimated future local employment trends. See also response to #6c.

7c. Wood for small business and value-added products

Letters and Comments on this Subject Included:

007(19) 010(2) 011 012 032 020 036 039 106 117-120 121 125 135 H2 C2(2) C6 C8

Examples Include:

"Small logging operations and specialty mills should be allowed to draw from the Tongass. Through careful extraction of saw logs and their milling they can provide high quality wood domestically and let the wood drift up in value to its rightful worth." 010

"The people of Whale Pass depend on the Forest for saw logs under the free use program. These provide lumber to do the many building projects undertaken in a developing community. Mopping up all the small, easily accessible stands of good timber left in the area further decreases the availability of this very necessary subsistence use of the forest." 012

"I am in favor of long term sustainable logging in southeast that supports individuals and small companies and keeps profits and cash cycling in the region." 032

"... the reason this takes place is because independent contractors such as myself are not allowed to bid on grade logs, because none are offered for sale by the Forest Service." SC6

Forest Service Response:

All timber prepared for sale in the Ketchikan Area is not intended for KPC. The independent sale program is a vital part of the total timber program on the Ketchikan Area. Historically, timber offered in independent sales has ranged from 30 to 50 MMBF per year. In 1992, approximately 32 MMBF of timber was made available for independent sales. The Ten Year Sale Schedule in the TLMP Draft Revision illustrates the amount of future volume and location of timber anticipated to be available to independent operators.

Because all of the CPOW Project Area is within Primary Allotment Areas "E" and "G" of the Contract Area, Section B0.32 of the KPC contract states:

"Timber for Local Use. The Regional Forester or designated representative may grant the use of timber from portions of the sale area to others than the Purchaser for local ultimate use in southeast Alaska to the extent of not more than two percent of the estimated total stand in any Value Comparison Unit, if in the judgement of the Regional Forester or designated representative, the operations of the Purchaser will

not be materially interfered with thereby. However, no withdrawals will be made under this Subsection from Timber Harvest Units identified in current Offerings."

During the remaining 11 years of the KPC long-term contract, it is unlikely that substantial timber volume will be offered from the CPOW Project Area to independent timber purchasers. There is potential for small salvage sales to independent timber purchasers in the project area for individual tree and small blowdown situations. After the termination of the KPC long-term contract in 2004, it is likely that the CPOW Project Area can support a higher level of independent timber offerings.

7d. Restrictions on sporthunting will reduce community income.

Letters and Comments on this Subject Included:

302

Examples Include:

"A complete analysis of the issue should also include the effect of Ketchikan hunters on the economies of POW communities. We suspect that the money they put into the island's economy is substantial. For example, Tenakee Springs businesses have already suffered economically since Juneau hunters' deer season in Tenakee Inlet was shortened three months by the Federal Subsistence Board." 302

Forest Service Response:

Any future restrictions imposed on sporthunting of deer by the Federal Subsistence Board could have an effect on the incomes of those communities which provide goods and services to the visiting non-subsistence deer hunter. However, the economics of sporthunting on Prince of Wales Island are more complex than the hunting of one species (deer) alone. Furthermore, deer hunter expenditures within individual POW communities are not currently quantifiable. The effects that reductions in deer habitat capability in the Project Area (or the potential limitations on non-subsistence deer hunting) could have on the total economic picture for the entire island are displayed the TLMP Draft Revision (1991) Chapter 3 Subsistence section and Appendix K.

8. KARST AND MINERALS

Public comment on karst and cave resource management was very focused. All of the comments on karst suggested either a moratorium on harvest or greatly reduced harvest on the karst ecosystem until inventories and resource evaluations are completed. The comments suggested that without adequate characterization of the karst ecosystem and the evaluation of the cave resources, the effects of timber harvest on the karst can not be fully understood.

As a result of comments received from the public, the issue of timber management on karst geology and the potential for impacts to cave resources is now considered to be a significant issue within the scope of this project. (See Chapter 1.)

8a. There should be reduced or no timber harvest, or a moratorium on harvest, on the karst ecosystem

Letters and Comments on this Subject Included:

003 007(19) 011 013 015 020 021 098 117-121 128 KT4 KT5 KT11

Examples Include:

"No cutting be allowed in the limestone karst areas until the cave resources have been identified and protected (as dictated by the Federal Cave Resources Protection Act of 1988)." 003

"I would like to see a five (5) year moratorium on harvest on the karst systems.... This would allow the Forest to conduct research into the physical and biological nature of the ecosystem and begin monitoring both in harvested and unharvested areas to establish baseline data." 015

"Karst areas are not adequately protected by this proposed sale. In accordance with the National Cave Protection Act and Region 10's own guidelines it would be of vital importance to exclude any units adjacent to or on karst." 117-121

Forest Service Response:

The Ketchikan Area's position is to protect all caves as "significant" caves under the Federal Cave Resources Protection Act until a formal significance determination has been made. Mitigation measures including buffers, partial harvests, and unit deferrals have been incorporated into all alternatives to protect this resource. All the areas of known karst development within the Project Area occur on lands which have been allocated to LUD IV by the existing Forest Plan. Alternative P of the TLMP Draft Revision allocates these areas to a variety of land use designations, including Available and Suitable, Timber Production, and Modified Landscape, all of which permit some degree of timber harvest. In order to meet the purpose and need for the CPOW project, it is necessary to plan timber harvest in all portions of the Project Area where permitted by TLMP and the TLMP Draft Revision. Consequently, the Forest Service is not implementing a moratorium or deferral of all areas with karst development, although specific areas have been deferred to meet environmental regulations and/or standards and guidelines.

8b. The Ketchikan Area needs more research of the karst ecosystem to help land managers to make better informed decisions.

Letters and Comments on this Subject Included:

003 007(19) 011 013 015 020 021 098 117-120 121 128 KT4 KT5 KT11

Examples Include:

"I would like to see the Forest Service pursue funding for an interdisciplinary study of ecological relationships within karst areas, with a focus on the effects of timber harvest and road construction." 013

"Once this data was established, the Area could better understand the cumulative effects of harvest on these (karst) systems, and make better timber management decisions." 015

"In accordance with the National Cave Protection Act and Region 10's own guidelines, we recommend that if a unit is adjacent to or on karst, then those particular units should be deleted until more scientific work is done to answer what effects logging activity has upon karst." 121

Forest Service Response:

Under 40 CFR 1502.22, it has been determined that there is incomplete or unavailable information on karst ecosystem functions, particularly the effects of timber harvest and road construction activities on karst hydrology, see #5c and #8g. In many cases the project has deferred timber harvest on areas of karst development. In other cases, harvest units were redesigned or else employed mitigation measures to lessen the impacts on the underlying karst development. Because of these measures, the unavailable information does not preclude the evaluation of reasonably foreseeable significant impacts. Consequently, the unavailable information should not preclude the decision-maker's ability to make a reasoned choice among the alternatives.

The Forest Service is making considerable progress in furthering the state of art understanding of karst ecosystem functioning. Recently the Ketchikan Area sponsored a "Karst Management Seminar" which focused on the complexity of the system and the need for research to define the characteristics of the ecosystem and monitor the effects of surface management activities on the karst and caves. As a follow-up to this seminar, the Forest Service is contracting a panel of professional karst researchers to help the Area determine the national and international significance of the Area's karst resources. The panel will also design and recommend monitoring criteria to help scientifically evaluate the effectiveness of Forest Service mitigation measures. The panel is expected to convene in the summer of 1993. As information becomes available through research and monitoring, standards and guidelines and mitigation measures will be adjusted accordingly.

There are many research opportunities associated with the karst and cave resources. The Area has begun to gather data on the geology, hydrology, and biology of the karst, with initial focus on establishing an overall understanding of basic ecosystem function. Enough data has been collected to help design study plans and research proposals, which will also include the research recommendations of the professional karst research panel. Much of this work can be accomplished under the Forest's Ecosystem Management Strategy program.

The Forestry Sciences Lab in Juneau, Alaska, in conjunction with the Pacific Northwest Research Station in Corvallis, Oregon, and the Center for Streamside Studies in Forestry, Fisheries, and Wildlife based at the University of Washington, have proposed research to classify the karst ecosystem. Two individuals have submitted proposals to study the biospeleology of the cave systems. Two proposals have been submitted to research the association between cave development and facies changes of the limestone and the importance of the structural elements of the bedrock. The University of Alaska, Fairbanks, recently submitted a proposal initiating long-term interdisciplinary research into the "Prehistory and Paleoecology of Southeastern Alaska Karst." Many other research and monitoring opportunities exist.

The Area has been searching for a karst system unaffected by timber harvest and road building so that baseline monitoring can be established. There has been a recent decision to defer harvest of an area within VCU 550 which will preserve the integrity of a karst basin unaffected by timber harvest. Twelve geologic special areas have been proposed on the Ketchikan Area by the TLMP Draft Revision to protect alpine/subalpine karst areas. One Research Natural Area (RNA) has been proposed, but has not been designated at this time.

8c. Improve discussion of all karst impacts

Letters and Comments on this Subject Included:

007(19) 011 020 021 106 121 128

Examples Include:

"Logging activity upon, in, or around the karst geological features raises some important issues. For example, what happens when logging activity raises or lowers the ground water feeding into the carbonates? What happens when volume of groundwater is increased because there is no longer a tree upper story system that captures and holds water? Does any of this activity change the pH of the carbonated ground water system. If it does, will this affect smolt production on streams coming out of the karst? Does it affect cave features and formations? What role does sediment play in this whole picture? What about bat roosting and hibernation, otter and wolf natal use, and deer use, etc.? This EIS is lacking in the analysis of these and other issues." 121

"It takes years to adequately and responsibly study and research the effects of surface disturbance such as logging and road building on the cave resources." 128

"There are no cumulative impacts depicted in the CPOW DEIS for the cave resource. This is a major omission." 020

Forest Service Response

The sections on Direct, Indirect, and Cumulative Effects, Karst Hydrology, Karst Biology, Karst Landscape, and Specific CPOW Potential Effects have been greatly expanded. Improved information, including the Karst Research Group's inventory and 1992 field season monitoring and observation, has been gathered since the DEIS was written. Many of the ecosystem characteristics and possible cumulative effects of proposed surface management activities are not fully understood or known. Discussions are based on field observations, local research, and extrapolations of cause/effects relationships of timber harvest on cave/karst systems elsewhere.

8d. Implement the Karst Research Group study recommendations.

Letters and Comments on this Subject Included:

020 021 121 122

Examples Include:

"Extensive inventory work has been done on potential karst units in CPOW. This work is not even mentioned in the DEIS. It should be presented and displayed and mapped. This inventory is the kind of site specific information on which the DEIS should be based." 020

Although mitigation measures were recommended by the KRG for each of those units overlying or adjacent to karst features,...(there are)...serious problems with applied mitigation measures. Therefore in order to adequately protect the remaining significant karst resources within the CPOW project area, we request dropping all units identified by KRG with karst resources." 021

"Is the USFS ignoring fragmentation studies and karst studies from interdisciplinary agencies? Data from these studies seem pretty conclusive in their summaries of the negative impacts on the long term sustainability of these forest resources with the continued cutting plans." 122

Forest Service Response:
The Karst Research Group (KRG) was contracted in 1992 by the Forest Service to conduct cave resource inventories which would identify areas of important karst development and cave resources within units proposed for harvest by the CPOW DEIS. The results of the KRG inventory were completed and made available just after the CPOW DEIS went to press. Approximately 167 proposed harvest units were surveyed for the existence of karst, of which 34 were found to contain significant karst or cave resources. As a result of this inventory, unit boundaries have been modified and some units have been deferred in the FEIS for the purpose of protecting significant karst features, including cave resources. The inventory also identified units which will require mitigation measures to ensure timber harvest in these areas is in full compliance with Forest Service standards and guidelines for protection of karst features, including cave resources. These standards and guidelines also apply to other areas which are later determined to contain significant karst features. Within the limits of keeping specific locations of individual caves confidential, as is required by the Federal Cave Resources Protection Act, the findings of the KRG have been included in the FEIS.

It is instructive to discuss the meaning of the term 'significant' as it applies to karst features and caves. It is important to understand there is a difference between a ***"significant karst feature"*** and a ***"significant cave"***. Current regulations which give cave/karst managment direction include: the Federal Cave Resource Protection Act (FCRPA) of 1988, FSM 2356, and the Ketchikan Area standards and guidelines for cave resource managment. Draft cave managment regulations have been published under 36 CFR Part 261 and 290. A ***"significant cave"*** as defined by the FCRPA means a cave located on Federal Lands that has been evaluated by the authorized officer and determined to have biotic, cultural, mineralogical, paleotologic, geologic, hydrologic, and/or other resources that have important values for scientific, educational, or recreational purposes. The Area consideres all caves significant until proven otherwise. A ***"significant karst feature"*** as defined in the Cave Resource Managment Standards and Guidelines is any feature within a karst landscape which has direct atmospheric and/or hydrologic connection. These may be streamsink, collapse, and solution dolines, solution channles, or vertical shafts. These are primary stream insurgence and resurgence points, and cave entrances.

8e. Protect karst from vandalism

Letters and Comments on this Subject Included:

130

Examples Include:

"I strongly urge the greatest possible protection for the caves on Prince of Wales Island.... I saw the damage that has occurred to some caves by people removing stalactites and stalagmites from a cave. I saw graffiti and human trash dumped into caves...." 130

Forest Service Response:

The Forest Service is taking reasonable precautions to protect caves from vandalism. The specific location of significant caves is kept confidential until such time a determination is made that public use would not create a substantial risk of harm, theft, or destruction. When caves are being developed for access to the public, the proposed action will be evaluated through the NEPA process. The effects of opening the caves

for recreational purposes will be carefully analyzed, with focus on public safety, as well as protection of cave resources. Generally speaking, unregulated access shall not be promoted.

8f. Expand minerals discussion.

Letters and Comments on this Subject Included:

134

Examples Include:

"Chapter 3 of the DEIS has an excellent evaluation of cave resources and karst topography, but does not give adequate consideration to the mineral resources." 134

Forest Service Response:

The minerals discussion in Chapter 3 of the FEIS has been expanded to reflect the comments provided. Opportunities to accommodate timber and mineral development with the same road system is discussed.

8g. Modeling of cumulative effects of surface management activities on the karst; developing a hydrologic model.

Letters and Comments on this Subject Included:

015 021 309 020

Examples Include:

"...I believe I see significant impacts of harvest on these areas....I see greatly increased runoff and acidity of the karst waters. Impacts of this nature could greatly decrease the productivity of the ecosystem." 015

"The effects of harvest (on the karst) can be inferred--that is, tending toward the lower productivity of non-karst systems by lessening chemical buffering effects through higher flows. It is an elementary tenet of forestry that cutting trees increases water flows." 020

"...expresses the specialist's concern with currently used road building and logging techniques because they will cause enough soil disturbance and subsequent sediment runoff to clog the identified karst hydrology." 021

"We have a lack of extensive and intensive hydrologic data in the northern part of POW. Additionally, the extent of subterranean caverns is unknown and there is a horrendous lack of knowledge of the interrelationship of surface to cave hydro-mechanics, and may I say, one is foolish (to) make judgements and extrapolations of this phenomena." 309

Forest Service Response:

Hydrologic models currently used for estimating the cumulative effects of proposed surface management activities are not designed to model the effects of timber harvest on the karst ecosystems. The Area has little information on the complexity of the karst hydrologic systems within the Project Area (see also response to Issue 8b and 5c).

Karst and cave development is a product of water's interaction on a soluble rock terrain (limestone). The geochemistry, nutrient cycling and capacity, sediment transport capabilities, and flow characteristics of the hydrologic system all contribute to karst and cave development. These parameters control passage formation rates, nutrient supply to the cave life, and to the productivity of the system as a whole. All of these parameters make up the karst's hydrology. More research will continue to define the karst basins and the effects of timber harvest on the karst hydrology.

Since all cave and karst features are being mitigated as though they were "significant" caves under FCRPA, there is sufficient information to make a reasoned choice among the alternatives.

9. PURPOSE AND NEED

Respondents who brought up this issue felt the stated purpose and need for the project was too narrow and unnecessarily restricted the range of alternatives. Others pointed out concerns with the timber sale schedule in Appendix A, including: it constitutes a major federal action and decision was made outside NEPA; it calls for harvest of more timber than necessary; it is inconsistent with regard to treatment of the Primary Sale Area; and should be extended through the year 2050 (end of the first rotation).

9a. Purpose and need too narrow

Letters and Comments on this Subject Included:

013 033 020 021 114 121 302 KT4 KT5 KT9

Examples Include:

"This very narrow purpose and need has severely limited the range of alternative actions considered in the DEIS." 013

"While the Forest Service has discretion under NEPA to define the purpose and need and scope of a project, we believe that Congress seriously limited that discretion in section 101 of TTRA. The Forest Service was, therefore, obligated to consider alternatives that favored non-timber resources and uses."

"I feel that the stated purpose and need for this project is too narrow. I don't think a board foot volume should be stated here. With 290 MMBF stated, a wide array of alternatives can not be developed." 033

"For starters, the annual harvest level is the first goal that's set in this planning process. So everything else has to revolve around the cut.... It's 290 MMBF per year or close to that, period." KT4

Forest Service Response:

The Council on Environmental Quality regulations do not provide specific guidelines for the development of the purpose and need for a project. Thus an agency has discretion in determining the purpose and need. The Forest Service has exercised this authority in a reasonable way that is not arbitrary or capricious. The FEIS examines a full range of alternative methods of attaining the specified purpose and need. The purpose and need statement is consistent with the sale schedule included in the TLMP as amended and TLMP Draft Revision. The range of alternatives for the CPOW Project do not violate Section 101 of TTRA, which is addressed directly in the TLMP and TLMP Draft Revision.

9b. Purpose and need decision was made outside NEPA

Letters and Comments on this Subject Included:

020 021 114 117 118 119 120 121 C1 C2(2) KT4 KT5 KT9

Examples Include:

"The agency claims that its schedule constitutes a decision. But the decision was made completely behind closed doors, out of sight of the public, and outside the NEPA process." 020

"Nonetheless, the Forest Service has refused to consider issues raised in the scoping comments and has remained fixed on satisfying a timber target reached outside the public process." 021

"The Purpose and Need presented in the EIS is an exercise in decision making outside of the NEPA process and intended to limit the range of alternatives considered in the EIS." 114

Forest Service Response:

Prior to undertaking a major Federal action, such as the CPOW proposed action, there is a requirement under NEPA to produce an EIS. One of the key elements in any NEPA analysis is the specification of the project's purpose and need. The specification of said purpose and need is part of the NEPA analysis itself and is not a major federal action requiring its own NEPA analysis. Consequently it is not necessary to perform a seperate NEPA analysis to identify the purpose and need for CPOW. The timber sale schedule (Appendix A) has been addressed in TLMP as amaended and the TLMP Draft Revision. The Revision process has had two formal public response periods totalling 9 months.

9c. Appendix A calls for more wood than is necessary

Letters and Comments on this Subject Included:

020 KT9

Examples Include:

"Even using a 615 MMBF 3-year figure, the 410 MMBF scheduled for the other three current EIS's plus the 120 MMBF left over from the 89-94 EIS would mean that CPOW only had to supply 85 MMBF to attain an available 615 MMBF 3-year supply." 020

Forest Service Response:

The total timber harvest called for under the Long-Term Contract is 8.25 billion board feet. Analysis indicates that KPC needs to harvest an average of 205 MMBF per year to complete the contract. Four timber projects--North Revilla, CPOW, Lab Bay, and Polk Inlet--were initiated for the KPC Long-Term Contract within the Primary Sale Area (PSA), as directed by the contract to seek to find timber supplies within the PSA before seeking volume within contingency areas. These four projects are needed to produce sufficient volume to provide KPC with 205 MMBF for the 1993 logging season, as well as to provide a three-year timber supply of 615 MMBF. The desired timber supply is therefore 820 MMBF.

When these four projects were initiated there was expected to be approximately 120 MMBF of timber volume (approximately 30 MMBF within the CPOW Project Area) remaining from a previous NEPA project (1989-94 LTS EIS) which would be available to KPC by the time the CPOW Final EIS is released. Therefore, these four projects were determined to need to produce a total of 700 MMBF, which when combined with the 120 MMBF currently available, would provide volume for the 1993 logging season, plus would contribute to maintaining a three-year timber supply.

This 700 MMBF was divided among the four timber projects based on the size of the project areas, as well as on their relative abilities to produce timber volume in an expedient fashion. Other factors considered in making this volume determination for the CPOW project included: (1) this harvest level is consistent with the sale schedule in the TLMP (1979, as amended); (2) sufficient volume has been determined to be available in the CPOW Project Area; (3) there is an extensive road network in place; (4) the number and location of Log Transfer Facilities is sufficient to handle this volume of timber within a thre-year time frame; (5) there are existing KPC-operated logging camps within the CPOW area to handle this volume; and (6) the current Forest Plan (TLMP 1979, as amended) calls for harvest in this Project Area.

Once these four projects were underway, delays were experienced in their completion. These delays were such that only limited volume could be made available from them for the 1993 logging season. This also had an effect of delaying the time when a three-year timber supply could be achieved. In an effort to provide enough volume for the 1993 logging season, and to stay on schedule for attaining a three-year timber supply, four independent sales were released to KPC. These sales total 107 MMBF and include: 12-Mile (12 MMBF), Frosty (33 MMBF), Shelter Cove (17 MMBF), and Starfish (45 MMBF). Frosty and Starfish are located on the Wrangell District of the Stikine Area.

The purpose and need for the CPOW project will remain unchanged. See Chapter 1 for a more detailed discussion.

9d. Appendix A is inconsistent with regard to the Primary Sale Area

Letters and Comments on this Subject Included:

020 112

Examples Include:

"Appendix A asserts very strongly that it is not necessary under the contract to go off the primary sale area at this time, and it pegs its analysis rigidly to this assertion. But not only is going off the PSA not contractually precluded, it is specifically contractually permitted -- and the agency is currently doing so with these independent sales. The Agency has been off the PSA in the past to supply KPC with timber, and it predicts it will be off the PSA in the future. The analysis' determination that the agency must now stay on the PSA is in error and arbitrary." 020

Forest Service Response:

The analysis recognizes that volume in the past has come from areas other than the Primary Sale Area (PSA) and will also need to come from off the PSA in future. However, sections B03.1 and B0.61 of the KPC contract allow the Regional Forester to designate cutting areas outside the PSA only to the extent sufficient timber is not available within the PSA to meet contract volume requirements. That point has not been reached. Sufficient timber remains within the PSA to meet current volume requirements consistent with applicable standards and guidelines for protection of other resources. Further discussion of reasons for choice of the CPOW project area for environmental analysis at this time is found in Appendix A.

9e. Appendix A is arbitrary and changing

Letters and Comments on this Subject Included:

020 KT9

Examples Include:

"Clearly, the schedule "decision" is continually changing. EIS's have been added and dropped. Target volumes have been shifted, added and dropped. Target volumes have changed, and continue to change, based both on project level analysis flowing to the TLMP Revision team and analysis flowing from the Revision team to the project." 020

Forest Service Response:

The sale schedule for completing the project is dynamic and changes over time. The changes are made to incorporate new information at the project level and from the TLMP Draft Revision. However, the volume figures for the four EIS's currently underway in the Primary Sale Area have not changed. These volume figures were determined in order to produce a three-year supply of timber while still reflecting the resources available in each area. See also the response to Issue 9c. Appendix A has been changed to reflect this information.

9f. Appendix A should display Starfish and Frosty

Letters and Comments on this Subject Included:

021

Examples Include:

"Why was no information provided regarding the Forest Service's substitution of independent sales (Frosty and Starfish) to KPC this year, and the effect of this additional timber supply and market demand?" 020

Forest Service Response:

The information in Appendix A indicates that the remaining timber supply consists of 120 mmbf from the 1989-94 LTS EIS. The timber supply has subsequently been augmented with approximately 110 mmbf from 4 timber sales, which had originally been scheduled for sale to independent timber purchasers. These include Frosty (33 mmbf), Starfish (45 mmbf), Shelter (17 mmbf), and Twelve Mile (12 mmbf). See also the response to Issue 9c.

9g. Incorrect interpretation of TTRA

Letters and Comments on this Subject Included:

021 114 115 117 118 119 120 121 C1

Examples Include:

"In avoiding the statutory mandate imposed by Section 101, the Forest Service apparently relies on the three-year timber supply requirement inserted into the KPC Long-Term Contract (hereinafter KPC-LTC) when the Forest Service revised the contract in February 1991. This self-imposed contractual requirement is fundamentally inconsistent with Section 101 because Congress intended this provision to subject the Tongass timber program to the same laws and market forces as all other national forests." 021

"It is well established in this and other recent Forest Service documents that the agency claims this modification is required by TTRA Section 301(c)(3). In fact, the Forest Service interpretation of this section is diametrically contrary to the actual intent and language in several respects." 114

"The current Forest Service treatment of proportionality is so extremely biased toward preserving high volume old-growth that the original intent of the proportionality requirement in the Tongass Timber Reform Act has completely lost meaning and is simply viewed now as a burden imposed upon the Long Term Contract and the Government by a fearful bureaucracy." 115

Forest Service Response:

The three-year timber supply provision in Section B0.62 of the KPC Long-Term Contract is related to Section 301(c)(1) and other provisions of the TTRA, not to Section 301(c)(3). The provision is consistent with Forest Service objectives of providing a three-year supply of NEPA-cleared timber for independent timber sale programs. Section B0.62 also facilitates completion of harvest of total KPC contract volume by the termination date of the contract, and repalces (along with other provisions in section B0.6) the five-year operating period timber supply scheduling requirements in the pre-TTRA contract. The provision is wholly consistent with TTRA Section 101. The GAO has agreed that the contract modifications in Section B0.62 comply with the TTRA.

9h. Continue Appendix A through 2050

Letters and Comments on this Subject Included:

105

Examples Include:

"While the Forest Service seeks to provide a sustained yield harvest basis, it is our understanding sustained yield is calculated for the total Ketchikan Administrative Area, instead of on a project or management area basis. In light of this we feel Appendix A should be expanded to provide harvest data, a sale schedule for the full rotation (2050) instead of just through the year 2000." 105

Forest Service Response:

Appendix A has been expanded to display decadal harvest by Management Area through the end of the first rotation (2045). This information is consistent with the information displayed in Appendix B of the TLMP Draft Revision.

10. RANGE AND QUALITY OF ALTERNATIVES

This issue was raised by many respondents. Those concerned called for a wider range of proposed timber harvest levels by the action alternatives, particularly calling for alternatives with less volume and, in some cases, an alternative that provided a long-term conservation strategy for wildlife populations. These respondents generally felt the proposed alternatives were ecologically destructive. Some stated that the proposed alternatives were virtually the same because too many of the units were common to multiple alternatives.

10a. Range of alternatives inadequate

Letters and Comments on this Subject Included:

003 006 009 010 011 012 013 019 022 025 026 030 031 032 033 020 021 034 046 048 049 050 054 055 056 058 059 061 062 064 067 068 070 072 075 081 082 084 085 086 089 090 091 098 112 114 116 121-122 126 128 131 134 135 124 295 302 H1 C2 C3 C6 S2 KT3 KT4 KT5 KT6 KT9

Examples Include:

"Initial glance at this draft proposal made me realize there are really only two alternatives being offered. One alternative in the "No Action" and the second one could be any one of Alternatives 2 thru 5 because there is no significant difference between the amount of timber to be harvested and when you look at the maps, there is no major differences in the pattern of timber unit layouts. Since the no action alternative would never be seriously considered, the public is forced to accept that 278 to 300 mbf WILL BE EXTRACTED in the next three years REGARDLESS of public input." (author's emphasis) 003

"The range of alternative presented in this DEIS is unlawfully narrow. The Forest Service has the obligation to consider alternatives with lower volumes of timber cutting to emphasize fish and wildlife values and subsistence uses in the project area. Limiting the alternatives considered to those that meet the "purpose and need" of the project, namely to supply KPC with approximately 290 MMBF of timber, violates applicable law." 021

"Please withdraw the present plan and develop a new plan that considers true range of alternatives with logging at sustainable rates only. I would like to see the plan error on the side of sustainable use, rather than depletion of the forest ecosystem." 026

Forest Service Response:

The Council on Environmental Quality (CEQ) regulations governing the implementation of the National Environmental Policy Act (NEPA) require that the alternatives, including the proposed action, respond to the underlying purpose and need for the project (40 CFR 1502.13). In the Notice of Intent (NOI), published

in the Federal Register, the Forest Service identified the purpose and need for the proposed action to be to make approximately 290 million board feet (MMBF) of timber volume available in compliance with the Ketchikan Pulp Company Long Term Timber Sale Contract.

Appendix A of the EIS describes the reasons for scheduling the environmental analysis for the CPOW Project Area at this time. Appendix A also describes the need for approximately 290 MMBF in one or more offerings to assist in meeting contract requirements. It briefly addresses the reasons why providing less than the contract volume was not considered in detail. This would include the option of cancelling the contract. In addition, reducing the volume provided, cancelling the contract, or withdrawing the Project Area from the contract area does not meet the purpose and need for the CPOW project. Appendix A also includes a discussion of available timber outside the Project Area.

The Forest Service has administrative authority to implement the KPC contract. It was to this end that the purpose and need was developed for the CPOW Project Area. Other public interests and concerns are considered in each alternative developed to meet the KPC contract requirements. The no-action alternatives are also fully evaluated.

The action alternatives presented in the FEIS range from 261 MMBF to 267 MMBF net sawlog plus utility. This range is 91 percent to 93 percent of the stated goal of 290 MMBF of total harvest. More importantly, these alternatives represent reasonable courses of action that address the issues and provide a clear basis for choice among options while accomplishing the stated purpose and need. While there is substantial overlap of proposed harvest units across the action alternatives, there are unique distributions of harvest units to meet the alternative development frameworks, see #10d.

As stated at the beginning of Chapter 2, the alternative development process was issue-driven and began with the determination of specific options that could be utilized to resolve each issue. The developed alternatives explore ways to satisfy public concerns and resolve the issues. They respond differently to the issues and provide a range of choices to the decision-maker and the public while still meeting the purpose and need. For example, Alternative F2 focuses the proposed actions, as much as possible, away from the habitat conservation area recommended by the Interagency Committee on Developing a Strategy for Maintaining Well-distributed, Viable Populations of Wildlife Associated Old-growth Forest in Southeast Alaska. Alternative F4 focuses the proposed actions away from helicopter yarding. Other alternatives similarly reflect different approaches to addressing the public issues.

The issue of sustainability is discussed also at the Forest Plan level. The Forest Plan Revision Appendix B (incorporated in this project by reference) shows areas of harvest by decade by TLMP Management Area over the planning horizon (150 years).

10b. Need "less ecologically destructive" alternatives

Letters and Comments on this Subject Included:

001 005 010(2) 011 012 026 034 045 048 052 063 064(2) 068 070 073 109 121 129 C2(2)

KT5 KT9

Examples Include:

"This plan will be devastating to fish, wildlife, the recreation resource, and to the local communities." 052

"Due to the environmental, economic, and social devastation of your 4 logging action-plans I believe the only viable alternative to the CPOW is the "No Action" Plan. I might add quite amazingly that not one of your considered alternatives provide for a sustained yield timber." 109

"All currently proposed alternatives, except the no action alternative, are unacceptable because of their huge impact on the ecosystem, the fisheries resources, and the economics of local residents once the timber sale is logged and completed. A much reduced scale of logging is needed to preserve the ecosystems and human institutions currently in place." 129

Forest Service Response:

The CPOW alternatives are designed to respond to the significant issues, while (1) meeting the purpose and need for the project and (2) complying with enviromental regulations and TLMP as amended standards and guidelines. Social and environmental consequences of the individual resources are fully analyzed by resource in Chapter 3 and compared in Chapter 2. It is the intent of the analysis to present a clear basis of choice to the decision-maker, in this case the Forest Supervisor.

All proposed harvest units within all alternatives: (1) meet visual quality objectives proposed for the project; (2) defer harvest within 500 feet of the saltwater shoreline, 1,000 feet of estuaries, and at least 100 feet of all known Class I and II streams; (3) defer harvest from Stevenson Island because of economic, visual, and cultural resource concerns; (4) defer harvest on the portions of the Thorne River/Hatchery Creek system under consideration for Wild and Scenic Rivers Act designation; (5) do not schedule harvest within the Sarkar Primitive Recreation Area; (6) do not require construction of additional LTF's; (7) protect integrity of all known areas of significant cultural resources; and (8) minimize disturbance to known significant cave resources.

In addition, all alternatives comply with the proportionality requirement of TTRA [Section 301(c)(2)]. All alternatives also meet the Forest Service Handbook direction for temporary proportionality departures, except in Management Area K03, which lies largely within the Lab Bay project area. It is expected the Lab Bay project will move proportionality within tolerance specified in the Forest Service Handbook (see Timber section of Chapter 3 for a more detailed discussion). The Forest Service preferred alternative does not harvest any volume class 6 or 7 in management area K03. Alternatives place less reliance on clearcut harvesting, ranging from 16% of acres harvested by non-clearcut methods in Alternative F5 to 9% in Alternative F3. Alternatives F2, F4, and F5 (the preferred alternative) avoid harvest within the largest of the habitat conservation areas identified by the Interagency Committee on Viable Populations. The preferred alternative proposes to partial cut all harvest units immediately adjacent to the Sarkar Primitive Recreation Area in order to blend the boundary between natural areas and those to be managed intensively for timber production. The preferred alternative also defers harvest within the Paul Young Creek area to minimize potential impacts to the adjacent Karta Wilderness.

10c. Need an alternative with less volume

Letters and Comments on this Subject Included:

002 005 006 007(19) 009 011 012 013 014 022 026 031 032 020 021 049 052 055 057(7)

059 061 062 063 064(2) 070 072(2) 075 081 082 085 086 092 098 114 129 131 134 110 121 135 294 295 302 C3 C6 KT4 KT5 KT6 KT7 KT9

Examples Include:

"Sound management requires less drastic logging over the next decade. If the volume taken in the next few years must be reduced to prevent a disastrous decline in supply in the future, then so be it. If the Forest Service cannot act to reduce the cutting, then it must advocate prompt Congressional action to alleviate the dilemma." 005

"We believe the draft should offer alternatives which specify smaller yearly harvests in order to provide for a sustainable yield of timber and steady employment. This would also allow for opportunities in tourism, sport and subsistence hunting and gathering, recreation and the protection of fish streams and domestic water supplies." 014

"Consider a true range of alternatives with much less logging -- one that does not result in unsustainable short-term timber cut at the expense of long-term productivity of fish and wildlife and the economic health of the local communities." 049

Forest Service Response:

Under 40 CFR 1502.14(a) agencies are required to "...rigorously explore and objectively evaluate all reasonable alternatives..." Alternatives must meet the project proposal objectives to be considered "reasonable". Consequently, the CPOW project has not considered in detail any alternatives, with the exception of the no-action alternatives, which were significantly above or below the volume level described in the purpose and need. For this project, the volume tolerance was determined to be approximately plus or minus 10 percent of 290 MMBF. As a result of substantial reconnaissance efforts between the DEIS and the FEIS, numerous areas were identified which the Forest Service felt should be deferred from harvest or should be harvested by other than clearcut methods. Because of this new information, alternatives presented in the FEIS contain lower volume than those proposed in the DEIS.

Alternatives with lower levels of harvest were developed and analyzed in considerable detail by the Forest Service. Some of these alternatives were presented to the public and key agencies/organizations in April 1991 to provide feedback from public scoping. These early alternatives, as well as more recently developed ones, were subsequently dismissed from consideration because they did not meet the stated purpose and need for the project. They are discussed in Chapter 2.

The Draft EIS analyzed timber supply based upon the project's MELP. For the Final EIS, timber supply is analyzed based upon the TLMP Draft Revision's estimate.

10d. Too much overlap of units among the alternatives

Letters and Comments on this Subject Included:

003 013 033 020 021 050 054 061 067 082 084 110 114 121 122 302 C3 KT3 KT4 KT5 KT9

Examples Include:

"The range of alternatives offered by the CPOW DEIS varies less than 5 percent from this "approximate" target volume of 290 MMBF. As important, of a volume pool of 408 MMBF identified as available for this

project, the four action alternatives all harvest between 68 percent and 74 percent of the units. Thus there is very substantial overlap and similarity among alternatives." 020

"The primary purpose of an EIS is to provide for rational decision making based upon extensive alternatives that are not in and of themselves basically the same. Any EIS that fails to do this is going to be inadequate and any decision based on it will be invalid, and therefore, it becomes a flawed process at best." 121

"...There is no significant difference between these alternatives in the amount of timber to be harvested. And we look at the maps there's no major differences in the pattern of timber layout." KT4

Forest Service Response:

The CPOW MELP identifed 1,176 individual harvest units within the Project Area. After deferring units that were determined, based upon office and/or field reconaissance, to not meet Forest Plan standards and guidelines (both TLMP 1979 as amended and Draft Revision 1991), units within the proposed Wild and Scenic River corridor, units adjacent to existing clearcuts which have not achieved green-up, units less than 10 acres in size, units on Stevenson Island, and units within known goshawk areas, there were 652 units eligible for consideration. Many of these units could not meet proposed visual quality objectives at this time because of past, adjacent harvesting. Many more could not be harvested simultaneously because the resulting contiguous opening would exceed NFMA dispersion requirements. The final unit pool considered by all alternatives for the CPOW FEIS includes 363 units. The alternatives considered in detail each harvest approximately 230 units, and defer 133 (37 percent).

10e. Need true wildlife/subsistence alternative

Letters and Comments on this Subject Included:

020 021 059 068 087 110 127 302 H1 C1 KT8 KT9

Examples Include:

"... the Forest Service's failure to consider an alternative that maintains subsistence uses in the project area to the greatest extent possible is unlawful." 021

"In the absence of a plan for maintaining retention, some alternative strategy needs to be developed for the protection of wildlife resources. The activities proposed by this DEIS are not visibly tiered to a scientifically credible plan for maintaining viable and well distributed populations of wildlife. We believe the FS needs to incorporate current conservation biology concepts and strategies which will maintain biological diversity in the CPOW area." 302

"This is non-sustainable in my terms of lifestyle. It affects me adversely in terms of food, lifestyle, quality of life, real and in terms of possibility for future generation of Haida. So the only alternative that I can see is one that works in real terms for traditional uses -- that means, no roads and no logging." H1

Forest Service Responses:

Alternative F2 avoids harvest within areas recommended for wildlife conservation by the Interagency Committee on Developing a Strategy for Maintaining Well-distributed, Viable Populations of Wildlife Associated With Old-growth Forest in SE Alaska. Alternative F4 and the preferred alternative (F5) both defer harvest within the larger of the two habitat conservation areas. Alternative 3 of the DEIS (which has been dropped from consideration because it did not meet the stated purpose and need) avoided harvest

within high subsistence use areas identified by TRUCS, the FEIS for 1989-94 LTS contract, and site-specific public comments on the CPOW DEIS regarding subsistence and wildlife conservation. Alternative F6 was developed to avoid harvest within site-specific units identified by public comments on the CPOW Draft EIS pertaining to subsistence and wildlife conservation.

Furthermore, lifestyle considerations have been assessed and accounted for through the land use designations and associated standards and guidelines at the Forest Plan level.

10f. Need better analysis of no-action alternative(s)

Letters and Comments on this Subject Included:

035 128

Examples Include:

"The analysis of the alternative 1 and 1a as depicted throughout the Draft EIS reflects insufficiently the impact of the 'no action' alternatives. Even though the purpose and need was an action, serious evaluation of the no action alternatives (as I believe is required by NEPA, NFMA, or one of those things) is blatantly missing. It is apparent that under NO CIRCUMSTANCE are one of the no action alternatives to be considered and are presented as 'straw' alternatives present only to attempt to satisfy some requirement." 035

"No harvest options clearly do not get the emphasis they should with 'timber at all cost' once again the norm." 128

Forest Service Response:

The Code of Federal Regulations [40 CFR 1502.14(d)] requires that agencies shall "Include the alternative of No Action." This alternative is required within all NEPA analyses to provide a benchmark to compare outputs and effects, even though this alternative does not meet the purpose and need of the project. For CPOW, the Forest Service has identified two no-action alternatives: Alternative 1 proposes no additional harvest, but permits continued harvest of units sanctioned under a previous NEPA review; Alternative 1A proposes complete cessation of all timber harvest within the Project Area. The outputs and environmental effects of Alternatives 1 and 1a are shown in all tables, figures, and graphs within the document where alternatives are analyzed.

11. MULTIPLE USE CONSIDERATIONS

Public comments suggested that the management focus for central Prince of Wales Island is focused on timber harvest and does not provide full consideration for other resources, particularly subsistence, recreation, and fish and wildife populations. There was call for an integrated, holistic analysis of all resources.

11a. Need consideration for hunting, fishing, subsistence, recreation, tourism

Letters and Comments on this Subject Included:

001 002 006 009 010(2) 011 014 016 020 021 022 026 030 031 032 036 041 042 049 050

051 052 053 055 056 057(7) 058(2) 061 062 063 067 070 071 072(2) 073 075 077 085 086 089 091 092 098 106 109 110 112 114 116-120 121-123 125-129 131 133 135 290 294 295 302 C2(2) S3 KT1 KT3 KT4 KT5 KT6 KT7 KT8 KT9 KT11

Examples Include:

"The Forest Service has an obligation to manage the Tongass for multiple use, with the future well-being of its residents foremost in mind." 014

"Long term needs of POW Island economics, tourism, and recreation were not addressed properly in the EIS. If the sale proceeds, most of the old growth timber within the project areas will be gone by 2004 even though we are only halfway through the rotation cycle. This is contrary to the MUSY Act of 1964." 116-120

"It's critical that the bottom line always be sustainable wildlife populations, sustainable timber and yield for something is left for future generation" KT4

Forest Service Response:

The Multiple-Use Sustained-Yield Act of 1960 Section 1 states, "It is the policy of the Congress that the National Forests are established and shall be administered for outdoor recreation, range, timber, watershed, and wildlife and fish purposes." The Tongass National Forest, as a whole, is managed for multiple uses. Not every area, watershed, or travel route can accomodate multiple uses at all times. Under TLMP as amended, approximately 23 percent of the Tongass National Forest is designated LUD IV (areas for commodity development) and an additional 15 percent is designated LUD III (areas for a mix of commodity and aesthetic resource management). Thus, over 60 percent of the entire Tongass National Forest is available to provide scenery, fisheries, wildlife, and subsistence opportunities without any timber development.

At the project level, the CPOW project has developed a range of alternatives which addresses the issues identified in scoping. The range of alternatives, combined with the design criteria and the mitigation measures, protect resources such as wildlife, fisheries, subsistence, and tourism opportunities consistent with the Forest goals for the land use designations in the project area.

11b. Need integrated analysis of multiple issues.

Letters and Comments on this Subject Included:

021 028 098 103 106 109 112 121 127-129 131 290 303

Examples Include:

"Throughout the document singular resource effects of FS actions by alternatives are addressed but I can find no indication that an attempt to evaluate the interactive effect of all resources have as a whole. How the interconnectivity of the resource effects are not sufficiently addressed." 028

"Feeling somewhat powerless in the face of big business, I can only beg you to think holistically when making final decisions." 103

"Whatever happened to ecosystem management?" 109

Forest Service Response:

The preferred alternatives (F5) proposes management of the resources of the Project Area in an integrated manner. The following summarizes how each of the five resources alluded to in the Multiple-Use Sustained-Yield Act of 1960 are considered:

outdoor recreation

- all harvest units are designed to meet VQO's;
- no harvest within proposed Wild and Scenic River corridor for Thorne River/Hatchery Creek system;
- no harvest in Paul Young Creek to prevent intrusion on adjacent Karta Wilderness;
- all proposed harvest adjacent to Sarkar Primitive Recreation Area will be partial cut to blend edge between a natural area and an area to be managed intensively for timber production;
- all known cultural sites are protected from harvest;
- harvest is deferred or reduced on significant, identified cave resources.

range

- there is no use of the Tongass National Forest for domestic forage production.

timber

- there is reduced reliance on clearcutting: 8,257 acres to be harvested by clear-cutting and 1,579 acres to be harvested by alternative means;
- as some of the more isolated and difficult harvest areas are entered, there is a reliance on more sophisticated methods of yarding, such as helicopter;
- 269 MMBF of useable sawlog + utility logs are produced, with a positive mid-market assessment value of $3.83 per MMBF;
- $4.6 million are returned to the State of Alaska for use in building and maintaining schools and roads;
- approximately 2,332 person years of timber related employment will be created from the 269 MMBF of timber harvested;
- all harvested units will be regenerated within 5 years of harvest.

watershed

- through application of TTRA buffers, uneven-aged harvest adjacent to all riparian areas, and adherence to BMP's, there will be no degradation of surface water quality;
- there will be no harvest adjacent to community water supplies;
- although there may be additional water production, this is neither a benefit nor detriment within the Project Area.

wildlife and fish

- no harvest is proposed within 500 feet of the saltwater shoreline and with 1,000 feet of all estuaries;
- harvest is deferred within the largest of the habitat conservation areas recommended by the Interagency Committee on Viable Populations;
- snag patches are prescribed in VCU's where there is an identified lack of habitat for cavity nesters;
- wildlife islands are prescribed to maintain some structural diversity within some of the larger proposed harvest units;
- harvest will be seasonally regulated in areas important to wintering trumpeter swans;
- there will be no harvest within 100 meters of all known bald eagle nests and within approximately one square mile of all known, active goshawk nests.

12. PROTECTION OF SPECIFIC AREAS: Honker Divide, Sarkar, Sweetwater/Barnes Lake, Neck Lake, Mable Creek, Sandy Beach, Staney Creek and Staney Creek Campground, Rush and Brown Mines, Paul Young Creek, VCU 581, Whale Pass area, Luck Lake, Ratz and Little Ratz Harbor, all Prince of Wales Island old growth, and near communities.

Public comment regarding specific areas generally requested no harvest activities to protect a variety of resources. These resources included wildlife habitat, caves, cultural sites, recreation areas, subsistence opportunities and resources, and viewsheds.

Letters and Comments on this Subject Included:

003 007(19) 011 012 016 019 020 021 033 037 047 093 098 101 102 103 112 113 114 121 122 125 128 131 302 C1 C3 C5 H1 H4 S2 S3 KT4 KT5 KT8 KT9 KT11

Examples Include:

"Sarkar Lakes should not be logged and any logging proposed for Sarkar Inlet should provide for a 1-mile buffer on both sides of the Inlet from the beach to the bridge." 019

"The OLD GROWTH areas by the Staney Creek, Neck Lake, Mable Creek, Barnes Lake, Sweet Water areas should all be left alone." 102

"I am particularly concerned with harvest activities in the Staney Creek drainage, Ratz and Little Ratz Harbor, Neck Lake, Luck Lake, Sweetwater Lake and Barnes Lake." 128

Forest Service Response:

Land Use Designations (management prescriptions) for these areas are identified in TLMP, 1979. In addition, this action is proposed to be consistent with the standards and guidelines of Alternative P of the TLMP Revision Supplement to the Draft EIS (TLMP Draft Revision 1991), offering a higher level of protection to many of these areas.

The CPOW preferred alternative defers or minimizes harvest in many of these areas of concern. There is no harvest proposed within the Sarkar Primitive Recreation Area and the units immediately adjacent will be partial cut to help blend the transition zone between areas to be managed in a natural state and areas to be managed intensively for timber harvest. The proposed unit immediately adjacent to the Rush & Brown mine (598-203) will be deferred from harvest. Also, there will be no harvest in either the Mabel Creek or Paul Young Creek drainages. Proposed harvest units near significant cave resources in the Neck Lake area will also be deferred under the Preferred Alternative at this time. See also responses to #4a-4d, Honker Divide.

13. DELAY CPOW UNTIL TLMP REVISION IS OUT

This issue called for a delay in the CPOW project until the TLMP Revision is published.

Letters and Comments on this Subject Included:

112

Examples Include:

"The Forest Service should either wait for the ROD on the TLMP Revision and then reissue the DEIS or redo the entire thing and base it on TLMP, as amended." 112

Forest Response:

The TLMP (1979, as amended in 1986 and 1991) is the existing Forest Plan and provides the current, approved direction to the CPOW project. In addition, CPOW is consistent with the standard and guidelines outlined in Alternative P of the TLMP Draft Revision.

The purpose and need in Chapter 1 (pages 1-5) states that this action is in part to help satisfy the three-year current timber supply requirement of the Long-Term Contract with Ketchikan Pulp Company. In addition, the action is also needed to satisfy the obligation set by Congress under the Tongass Timber Reform Act of 1990 "... to the extent consistent with providing for the multiple use and sustained yield of all renewable forest resources seek to provide a supply of timber from the Tongass National Forest which meets the annual market demand...." Because these two components of the purpose and need relate to providing timber volume within a specific timeline, it is not reasonable to delay the project until the TLMP Revision is finalized.

Appendix A explains why the Central Prince of Wales Project Area is scheduled for environmental analysis at this time.

14. ELIMINATE BELOW-COST TIMBER SALES

This issue brought out public concern for having timber offerings provide a positive net return to the U.S. Treasury.

Letters and Comments on this Subject Included:

063 KT1

Examples Include:

"Tell me what's 'National' mean if at below cost, timber (pulp) is sold to the Ketchikan Pulp Company?" 063

"Another item is, while I think that it's important that this DEIS strive to protect all resources, it also should make sure that the final alternative chosen creates a positive return to the Government; in other words, positive stumpage returns, and that it provides a viable alternative for the timber industry." *KT1*

Forest Service Response:

Current Forest Service Handbook direction (Sale Preparation Handbook, FSH 2409.18, R-10 Supp. 6, 1989) for Region 10 requires the completion of a mid-market analysis to compare benefits and costs of a project and is based on the best available information. The mid-market analysis shows that all of the action alternatives have a positive net stumpage (See Chapter 3, Timber Economics and response to #1d).

15. EXTEND PUBLIC COMMENT DEADLINE FOR THE DEIS

Those responding to this issue felt there was an inadequate amount of time to provide input.

Letters and Comments on this Subject Included:

001 002 006 009 014 019 022 023 025 031 036 041 046(7) 048 049 050 052 053 054 056 058(2) 059 061 062 063 064(2) 068 070 071 072(2) 073 075 081 082 085 087 090 091 098 107 109 110 111 112 116 121 122 123 129 133 136 H2 C1 KT6

Examples Include:

"Please extend the comment deadline until Feb. 1, 1993." 058

"I urge you to reconsider the options, and extend the public comment period." 107

"Please extend the comment deadline until February so that you may get more input from people like myself." 133

Forest Service Response:

The Council on Environmental Quality Regulations (40 CFR Part 1506.10) require a minimum 45-day public comment period on draft environmental impact statements. The public comment period for the CPOW DEIS ran from October 23 to December 7, 1992. The deadline was formally extended to December 14 due to delays in delivering the draft when copies were inadvertently mailed fourth class instead of first class. Comments were, however, received and considered until February 1, 1993.

16. NEW ANALYSIS

Public concern on this issue requested CPOW be rewritten, either by preparing a Supplement to the DEIS or by completely starting over. Other proposals were to delay CPOW for further study or to prepare a programmatic EIS to cover the Lab Bay, CPOW, Control Lake, and Polk Inlet projects.

16a. Write whole new EIS

Letters and comments on this Subject Included:

002 005 009 011 012 014 019 021 022 025 026 031 036 041 046(7) 048 049 050 052 056 057(7) 059 061 062 063 064(2) 068 070 071 072(2) 073 075 081 082 085 102 107 110 111 112 114 121 123 126 295 KT3 KT4 KT5 KT6 KT9

Examples Include:

"The CPOW should be redrafted to be based upon SUSTAINABLE cut levels!" 064

"You guys should go back and start again..." 075

"I think you should withdraw the entire CPOW plan and do it over again..." 295

Forest Service Response:

The CPOW FEIS provides a full and fair discussion of significant environmental impacts and informs the decision-maker and the public of the reasonable alternatives which avoid or minimize adverse impacts or enhance the quality of the human environment. The Code of Federal Regulations [40 CFR 1502.14(a)]states agencies shall "Rigorously explore and objectively evaluate all reasonable alternatives, and for alternatives which have been eliminated from detailed study, briefly discuss the reasons for their having been eliminated." Each alternative (except the no action alternatives) must meet the purpose and need to some large degree to be considered "reasonable." Sustainable harvest levels are discussed in the Timber section of Chapter 3.

16b. Prepare Supplement to the DEIS

Letters and Comments on this Subject Included:

020 021 114 121 122 302 KT9

Examples Include:

"Greenpeace requests...that a supplemental Draft be issued in light of the substantial overhaul of the plan this will require..." 114

"I propose that a supplement to the EIS be drafted that adequately addresses these issues from the viewpoint of longterm sustainability." 122

"This draft is not acceptable in its present form. In order to make it better it must be supplemented." KT9

Forest Service Response:

The Forest Service is unaware of any substantial change in the proposed action or of any significant new circumstances or information that would necessitate producing a Supplemental DEIS under 40 CFR 1502.9(c)(1)(i),(ii).

16c. Write a programmatic EIS for CPOW/Lab Bay/Polk Inlet

Letters and Comments on this Subject Included:

020 114

Examples Include:

"The breadth, scale and impact of the decision suggests it may need a programmatic EIS." 020

"This leaves open to conjecture whether there should be an overarching programmatic EIS with the three plans [CPOW, Lab Bay, Polk Inlet] under it, or whether the three should be rolled into one plan.... Our preference is that there be one EIS to encompass the three projects since this will be less burdensome on the public, and probably on the agency as well." 114

Forest Service Response:

The Forest Service utilizes a two-step planning process: the first level, the Forest Plan, provides land-use allocations for a second level project plan, where site-specific social and environmental effects are analyzed. The Tongass Land Management Plan (TLMP, 1979, as amended) is the planning stage where tradeoffs are analyzed among areas forest-wide over the remaining contract term and beyond. This would include evaluation of many items such as wildlife population viability, subsistence, availability of timber, and other considerations. The CPOW project was scheduled for analysis after consideration of the current TLMP (as amended 1986, 1991).

The TLMP is a permissive plan with four zones or Land Use Designations (LUD's) and allows analysis and scheduling of individual projects based on a zoning concept. The entire CPOW Project Area is in Land Use Designations III and IV, with the exception of VCU 554, which is LUD II and has been excluded from the Project Area. LUD's III and IV permit development for commodity resources. Chapter 1 and Appendix A display the reasons for scheduling the CPOW project at this time.

The TLMP is currently under revision, and the public can influence the scheduling of timber sale and other projects for the whole forest. The first draft was available for public review from June 1990 through January 1991. A Supplement to the Draft EIS for the revised Forest Plan was available for review and public comment until December 1991. The CPOW FEIS is consistent with the TLMP Draft Revision. The comprehensive analysis in the TLMP Draft Revision (including the cumulative effects regarding projected areas of timber harvest) has been fully considered in proposing the CPOW area for timber harvest. The allocation of timber harvest forest-wide, or KPC contract area-wide, is outside the scope of a project level plan such as the CPOW project.The cumulative effects of other timber projects on POW were addressed in the TLMP Draft Revision. Those cumulative effects have been incororated into this project by reference.

17. SUSTAINED YIELD

Public response on this issue focused on concern that the CPOW Project Area in particular and Prince of Wales in general have been over-harvested and are not being managed for sustained yield of timber and other resources. Some respondents felt that the past, current, and proposed future levels of harvest would be damaging to the long-term viability of the timber industry.

17a. Provide for sustained yield of other resources.

Letters Comments on this Subject Included:

003 005 009 020 021 034 048 048 050 052 054 055 057 061 059 064 067 070 077 082 085 086 090 098 114 117-120 121-123 126 127 128 131 133 135 302 H1 H2 C1 C2 C3 KT3 KT4 KT5 KT6 KT7 KT8 KT9

Examples Include:

"The EIS for CPOW does not provide for multiple uses and sustained yield of all renewable forest resources as directed by section 101 of TTRA. Section 101 was intended to subject the Tongass Timber Program to the same law and market forces as all the other national forests. The timber harvest is limited in section 101, to levels that sustain economic use, tourism, recreation, wildlife, fisheries, and uses of timber while protecting watersheds. This is not happening in the proposed sale."

"Fishing, hunting, recreation, and the subsistence needs of today's and future inhabitants of the island must be protected, and logging must be limited to an amount that assures a sustainable yield in perpetuity. A detailed analysis of the impact of the revised plan must include a credible description of its impact on fisheries."

"The DEIS further violates the TTRA because the Forest Service ignores the conditions precedent to the "seeking to provide" language of Section 101. These conditions further serve to deemphasize timber cutting and enable Tongass' management to more easily achieve the multiple use and sustained yield ideal of the Multiple Use and Sustained Yield Act (MUSY) of managing forest resources "so that they are utilized in the combination that will best meet the needs of the American people." Thus, although Congress impaired one of the uses envisioned by the MUSY by enacting Section 101 of the TTRA -- timber -- it enhanced three others -- recreation, watershed protection, and wildlife and fish. Both the plain meaning of this provision and legislative history support this inference." 021

Forest Service Response:

The Multiple Use Sustained Yield Act (1960) states in Section 2: "The Secretary of Agriculture is authorized and directed to develop and administer the renewable surface resources of the national forests for multiple use and sustained yield of the several products and services obtained therefrom. In the administration of the national forest due consideration shall be given to the relative values of the various resources in particular areas."

The Act further states in Section 4(b): "'Sustained yield of the several products and services' means the achievement and maintenance in perpetuity of a high-level annual or regular periodic output of the various renewable resources of the national forests without impairment of the productivity of the land."(16 U.S.C. 531).

Further direction regarding sustained yield management is contained in Section 101 of the TTRA (1990), which states: "The Secretary shall, to the extent consistent with providing for the multiple use and sustained yield of all renewable forest resources, seek to provide a supply of timber from the Tongass National Forest which (1) meets the annual market demand for timber from such forest and (2) meets the market demand from such forest for each planning cycle."

Sustained yield is calculated and managed at the Forest level, which means the Forest Service must manage the entirety of the Tongass National Forest on a sustained yield basis. There is no requirement that each project area or other segment of a National Forest be managed in isolation on a sustained yield basis. It is also not biologically possible to manage any isolated area for maximum production of all resources simultaneously. TLMP as amended (1979) made a decision to reduce the scope of the sustained yield management unit from the entirety of the Tongass National Forest to individual Administrative Areas, i.e., Chatham, Stikine, and Ketchikan. Consequently, sustained yield for the Ketchikan Area of the Tongass NF is a forest issue and is discussed in the TLMP and TLMP Draft Revision.

The Forest Service has no requirement to manage the CPOW Project Area in and of itself for sustained yield of non-timber resources. Nonetheless, there are individual resources which can achieve "maintenance in perpetuity of a high-level annual or regular periodic output...." Water quality, soil productivity, fishery production, and outdoor recreation are predicted to be maintained at high levels. Other resources, such as deer, bear, and old-growth habitat, will probably decline on a localized basis, but are planned to be available on a Forest-wide basis. The cumulative effects over time, including sustainability of timber harvest, are displayed in the TLMP Draft Revision which is incorporated in this project by reference.

See also response to #7a.

17b. Provide for even flow of timber to local communities

Letters and Comments on this Subject Included:

003 005 006 007(19) 008 009 011 012 013 014 016 022 030 031 032 020 021 039 041
046 048 049 050 051 054 055 056 058 057 061 062 063 059 064 067 082 085 087 089
090 098 105 109 110 112 114 116 117-120 121-123 125-128 131 133 134 135 295 299
302 H1 H2 C1 C2 C3 C4 C7 KT4 KT5 KT6 KT7 KT9 KT11

Examples Include:

"I am very concerned over the Forest Service's apparent lack of interest in providing a steady and dependable supply of wood for our community beyond the end of the Long Term Sale Contract (LTS)." 008

"We believe the draft should offer alternatives which specify smaller yearly harvests in order to provide for a sustainable yield of timber and steady employment. This would also allow for opportunities in tourism, sport and subsistence hunting and gathering." 014

"I am in favor of long term sustainable logging in southeast that supports individuals, small companies, keeps profits and cash cycling in the region." 032

Forest Service Response:

See the first four paragraphs in the previous response (#17a) and #7a.

The Forest Service has no requirement to manage the CPOW Project Area in and of itself for a non-declining, sustained yield of timber. As previously stated, this requirement is applied to the overall Ketchikan Administrative Area. However, in response to considerable public concern with even-flow of timber to local communities dependent on the CPOW Project Area, the Timber Section of Chapter 3 shows Project-Area-specific even timber flow estimations, based upon Alternative P of the TLMP Draft Revision. The CPOW MELP was used to estimate timber supply in the Draft EIS. This analysis has been replaced in the Final EIS by the timber supply estimate of the TLMP Draft Revision. Also shown are even timber flow estimations for the adjacent Lab Bay and Control Lake projects, all of which are based upon the TLMP Draft Revision. This issue has been incorporated in Significant Issue #7, as discussed in Chapter 1 of the FEIS.

17c. Overcutting will hurt the timber industry

Letters and Comments on this Subject Included:

005 011 012 020 039 063 064 071 106 110 112 121 125-127 131 135 H1 C2 C4 KT9 KT11

Examples Include:

"Basically, the area will support nothing. Perhaps 10 MMBF of timber per year, if there are any pulp mills left, which is unlikely. No jobs for people at Little Naukati, Coffman Cove, Thorne Bay and Whale Pass." 112

"To look more holistically and ecologically at how FS planning effects, adversely I'll add, the health and future of the Prince of Wales ecosystem and really the long term survival of the timber industry in Southeast Alaska for that matter." 071

"If this island is to have a future in the timber industry, sustained yield cutting will be the only way to provide this future. Small timber operators are being cut out of the forest with the alternatives you provide. The saw logs will be gone. The truth is that the forest cannot be maintained in a healthy state by the industrial style logging you promote." C2

Forest Service Response:

The Timber and Socio-Economic sections of Chapter 3 discuss future timber supplies in relation to past and proposed current levels of harvest. The conclusion is that, based upon the timber supply estimates of the TLMP Draft Revision, future harvest levels can be maintained at current levels. The Draft EIS inappropriately used data from the project's MELP to analyze future timber supply. It is likely that in the future, improved technologies in the logging and wood processing industries will reduce the number of jobs which can be derived from a given volume of timber.

The USDA Forest Service has developed, and will continue to expand upon, programs which will assist communities and individuals desiring to acquire the necessary skills to develop a more diversified employment base.

17d. Second-growth provides poor quality wood

Letters and Comments on this Subject Included:

010 039 SC2

Examples Include:

"Ask any woodworker or wood products person -- a 50 year second growth tree is not a renewed 300 year old tree. The Tongass clearcut is worthless more or less forever." 010

"Second-growth management has not been considered -- a one hundred year-old fast growing hemlock tree has little structural value. In the future, where will the resources be for piano, guitar, and boat woods?" 121

"My husband, a boat builder and wood worker, finds 100 year old second growth hemlock useless. Where will the next generation boat lumber coming from? Where will guitar and fiddle tops come from? The forest rotation of 100 or even 150 years will never provide quality timber. These trees will be good for nothing but pulp." C2

Forest Service Response:

After completion of the first rotation, old-growth forest products will be available only in very limited quantities. Fast-growing second growth trees will not produce the same high-quality dimensional lumber as can be processed from old-growth logs. Second-growth logs can, with current technology, produce studs, pulp, and chips for fiber/wafer board. It will be approximately 60 years until any appreciable quantities of second growth are logged on the Ketchikan Area, and future wood technologies will likely find additional uses for second growth logs. Old growth harvest, though reduced after 60 years, will continue on a greatly reduced scale over the planning horizon (150 years).

18. ACCESS MANAGEMENT

Public comment on Access Management concerned the thoroughness of the management plan, the amount of road to be closed, and the implementation of the Access Management Plan for the 1989-94 LTS FEIS.

18a. Access management needs to be addressed more thoroughly

Letters and Comments on this Subject Included:

003 008 033 112 302 K2 KT1 KT2 KT4 KT5

Examples Include:

"This is not to say that all roads should be closed. But it is important to realize and plan for these kinds of problems in the future." 003

"It would be effective to state why the roads are being closed." 033

"The DEIS should also develop a plan to provide for the long-term viability of species which are most impacted by the loss of roadless areas. Most of the roads built on POW are kept open for multiple logging entries, or are accessible by 'all-terrain vehicles,' and the proposed 'Road Access Management Plan' is not effective in addressing this problem." 302

Forest Service Response:

The Transportation section of Chapter 3 lists, road by road, the access management prescription for each specified road in each alternative. The listing states whether the road is scheduled to be closed. The ROD contains Road Management Objectives (RMO's) for all roads outlining the management strategy for each road. RMO's developed for each road will include the reason for closure, type of closure to be applied.

18b. More roads should be closed/should be left open

Letters and Comments on this Subject Included:

008 024 029 060 074 125 132 K1 K2 KT2

Examples Include:

"...road closures must become an integral part of your management scheme." 008

" I think the roads not in (use) be closed or dug up." 060

"...suggest roads which have been used for logging be left open after the unit is harvested to ensure access to the area for hunting, fishing and general recreation." 074

Forest Service Response:

Road closures are executed for numerous reasons including fish and wildlife protection and lack of road maintenance funding. It may be necessary to close roads to specific uses. There are different types of road closures that will be used including gates, roadway obliteration and vegetative management, depending upon the intent of the closure. Types of closure for each road will be designated in the Road Management Objectives (RMO's). Access Management classification (AM class) prescriptions indicate whether or not roads are to be closed. Under AM class 3, 4, and 5, all local roads are to be closed to motorized vehicles. This will result in at least 90 percent (depending on alternative) of new specified roads being closed after harvest activities are completed. Non-motorized access, such as hiking, bicycles, cross-country skiing, etc. are permitted.

18c. 89-94 did not follow through with access management

Letters and Comments on this Subject Included:

008 033 112 K2

Examples Include:

"Your statement that roads will be closed does little to comfort me based on your history for road closures based on 89-94 EIS." 008

"Local citizens have expressed concern to me that the road plans for 89-94 EIS weren't implemented 100%." 033

"Claiming that road closures are an effective mitigation measure is deceptive, since these closures seldom take place. Most of the roads scheduled for closure in the 89-94 EIS have been left open." 112

Forest Service Response:

It is true that not all roads estimated to be closed in the Access Management plan adopted in the 1989-94 LTS ROD have been closed at this time. The Access Management Plan estimated that approximately 458 miles of specified road (34% of the total) would be closed to vehicular traffic on POW by the end of the project.

Since 1989, the Forest Service has closed 131 miles of specified roads and installed 38 gates that will close another 121 miles of specified road after post-sale activities are completed. Additional roads in Lancaster and Calder are effectively closed since they are isolated and cannot be accessed by the public, except from a boat. In additon, 327 miles of temporary road were closed that were not on the inventory.

Some of the roads scheduled to be closed under the Access Management Plan from the 1989-94 ROD will remain open due to the continued use of the road during implementation of CPOW timber harvest activities. To identify future management for each of these roads, the CPOW ROD will contain a listing of each road and its stated Road Management objectives. Option "B" will remain open due to continued use of the road during implementation of CPOW timber harvest activities. Upon completion of CPOW activites, the roads will be managed as stated in the Road Management Objectives.

19. NO UNIT EXPANSION

Comments on this issue noted that during implementation of the 1989-94 LTS EIS, sale layout extensively occurred outside the boundaries as established by the ROD. Public comment suggested that the CPOW ROD contain language which would prohibit this activity.

Letters and Comments on this Subject Included:

013 020

Examples Include:

"I am in favor of the CPOW ROD restricting harvest to within the boundaries of the selected units and not permitting wholesale generic unit expansion." 013

"All units should be drawn on 'as laid out' cards. Changes over 10 percent variation from the design stage should be signed off by the Forest Supervisor. Units with over 15 percent difference should be subject to a Supplemental NEPA process. If cumulative differences for any offering reach 15 percent, that offering should be subject to a supplemental NEPA process. All changes should be documented, whether or not they benefit the environment." 020

Forest Service Response:

The boundary configuration of all units selected for harvest by the CPOW ROD are shown on the unit cards accompanying that document. These unit configurations are based upon IDT analysis using the best office and field reconnaissance data available. During on-the-ground unit lay-out, it is possible that changes in the planned unit boundary or proposed road location will be necessary to meet environmental regulations, adopted Forest Service standards and guidelines, or to more fully fit on-the-ground conditions to be consistent with this EIS. Unit boundary changes may also occur during sale administration under the B2.37 Minor Change clause which states: "Within Offering Area, minor adjustments may be made in boundaries of timber harvest units or in the timber individually marked for timber harvest when acceptable to Purchaser and Forest Service." All efforts will be made to keep on-the-ground changes within the planned ROD boundaries, as documented on the unit cards. All unit changes, including changes to boundaries, will be documented on unit cards. The CPOW ROD contains specific language that provides criteria for determining what types of changes are authorized without additional NEPA review.

The Forest Supervisor will be responsible for determining if and when changes in the "as planned" unit are significant enough to warrant additional NEPA analysis.

20. CULTURAL RESOURCE PROTECTION

Public comment expressed concern for the cultural resource management process including the protection of archaeological and historical sites, involving Alaska Natives in the planning process, explanation of Alaska Native traditional use and religious sites, and sovereignty issues.

Letters and Comments on this Subject Included:

016 020 035 093 099 102 112 S2 S3 KT11.

Examples Include:

"We are concerned that potential cultural and archaeological sites may not have been fully inventoried, and that even known sites will play little role in alternative design." 020

"What is done with all this information when completed? Does it just get stamped and filed away, or is there a process that it goes through to protect these historical and cultural sites?" S2

"The cultural resources section was well written but only contained Forest Service interpretations of information it controls or has at its direct disposal.... The USDA Forest Service manuals address the relationship that the Forest Service is to have with native groups and a serious look at how the EIS process fits in that role needs to be examined and not overlooked here." 035

"Some areas may have Traditional or Spiritual significance for Contemporary Native Alaskans. I would like this clarified." 102

"A couple of potential units impinge pretty heavily on recreational opportunities and archaeological resources in the Salt Chuck area." 093

Forest Service Response:

The National Historic Preservation Act and implementing regulations require a management program to identify, evaluate, preserve, interpret and protect significant cultural resources on a Forest-wide and project-specific level. All proposed harvest units which were considered to have a high potential to contain cultural resources were field surveyed. Based upon the results of this survey, proposed CPOW harvest units and roads have been re-designed or in some cases deferred to avoid directly affecting all known site locations. Recommendations for special management consideration--including proposals for interpretive use, the deferral of specific units, or the modification of unit boundaries and road locations to protect specific site locations--have been implemented in portions of the Salt Chuck Area in VCU 598; the Mabel Creek, Barnes Lake, and Sweetwater Lake watershed areas in VCU's 552, 553, and 573; the Sarkar Area in VCU 554.2; and the Neck Lake Area in VCU 550. For a more detailed discussion, see the Cultural Resources section of Chapter 3.

The laws and regulations which pertain to the protection of archaeological and historic sites (National Historic Preservation Act, the American Indian Religious Freedom Act, and their implementing regulations) require that Federal agencies maintain confidentiality of site specific information as a means of protection. These regulations also require that Native people be involved in the planning process and afforded access

to National Forest Lands to acquire traditionally used resources/forest products and to practice their religious beliefs. Native concerns, like all other public concerns, are considered during the planning, inventory, evaluation, and protection process.

21. KPC CONTRACT

This issue addressed a concern that Southeast Alaska could not support two long-term contracts and called for the cancellation of the KPC contract.

21a. Cancel the contract.

Letters and Comments on this Subject Included:

003 007 011 012 020 021 121 125 H2 C2 S1 KT8 KT10

Examples Include:

"The CPOW area could supply resources enough to keep local communities employed well into the future if the Forest Service would move quickly to extricate itself from the vise grip of the 50 year contract. ...I believe it would cost less taxpayer money to terminate the contract now then to let it go full turn and wreak the havoc it promises!" 012

"No mention is made of the recently filed suit by EPA alleging serious water quality violations or the ongoing criminal investigation associated with those violations. Why was such information not included? It certainly relates to the Forest Service's contractual and regulatory authority to modify or cancel the KPC long-term contract in order to protect the environment." 021

"If there is to be a long-term future for POW Island and its residents, then the Forest Service is going to have to deal with the advisability of the 50-year contracts. Is it for the better good of the nation to end such wholesale destruction now or for the Forest Service to fulfill a contract at immense public expense and destruction of an environment and a way of life?"121

Forest Service Response:

Congress has reserved to itself the question of whether to cancel the long-term contract (see #27). This issue was the focus of extensive congressional debate during the discussions which preceded the passage of the TTRA in 1990. At that time it was decided to modify the long-term contracts unilaterally (as opposed to cancellation) and require study of the adequacy of the timber supply (TTRA Sec 301 (e). The 301(e) report was transmitted to Congress May 1992.

21b. Capacity of SE Alaska to support two pulp mills.

Letters and Comments on this Subject Included:

039 KT8

Examples Include:

"*Can SE Alaska forests support two pulp mills indefinitely?" 039*

"*We can't support two mills." KT8*

Forest Service Response:

The response to this issue is beyond the scope of this EIS. However, the TLMP Draft Revision contains analysis which concludes that sufficient volume exists on the Tongass National Forest to allow timely completion of both long-term contracts and continue harvest over the planning horizon (150 years) on a non-declining flow basis. The TTRA also looked at this issue and in Section 301(e) required, in effect, that the Secretary of Agriculture submit an assessment as to whether the volume of timber required by the modified contracts could be provided and still meet the provisions of laws applicable to the management of the national forests.

The Irland Group (TIG) was awarded a contract in June 1991 to respond to the assessment required by TTRA Section 301(e). In April 1992, the Alaska Region of the USDA Forest Service prepared an *Executive Summary from Evaluation of the Irland Group Report*. The Forest Service summary states: "Under the timber markets that currently prevail and seem likely to prevail for the duration of the contracts, it will be difficult for the Forest Service to provide a timber supply that is both economically viable and sufficient in volume to meet the needs of the long-term contracts and to support the Small Business Administration portion of the independent timber sale program at current levels. Since the Forest Service has a long-term standing commitment to support an independent timber sale program, this finding poses important policy questions."

22. TIERING AND REFERENCING

These respondents questioned the legality of tiering to the TLMP Draft Revision and the availability of documents referenced in the EIS.

22a. Illegal to tier to TLMP Draft Revision

Letters and Comments on this Subject Included:

020 021 028 114 117-120 121 C2(2)

Examples Include:

"The decision tiers both to information and determinations contained in the TLMP Supplemental Draft EIS. It is improper to tier to the policy direction, the determinations, or even the information contained in a draft document." 020

"Tiering the analysis for this DEIS to the Supplemental DEIS for the TLMP Revision is illegal because that document only represents a DRAFT and therefore makes no final decisions." 021

"...much of the document has been tiered to the TLMP revision, a document still in progress and still not released to the public. We find this inconsistent with the NEPA process." C2

Forest Service Response:

The CPOW EIS tiers to the analyses in the TLMP 1979 EIS, as amended in 1986 and 1991 (see Chapter 1). The proposed alternatives are also consistent with the standards and guidelines in Alternative P of the TLMP Revision Supplement to the Draft EIS (TLMP Draft Revision 1991) currently in preparation (Chapter 1) and is incorporated by reference. These standards and guidelines are consistent with and, in many cases, provide a higher level of resource protection than the standards and guidelines in TLMP 1979.

22b. TLMP Draft Revision and other documents not readily available for reference.

Letters and Comments on this Subject Included:

117-120 C1

Examples Include:

"The EIS document has also been tiered extensively to the TLMP revision that is not complete or available to the public. How can the public have responses when the information in the EIS is tied to a document that is unavailable?" 117-120

"TLMP and references are used quite often in the document. But those aren't out in print that we can look at and compare. That would also be a valuable resource." C1.

Forest Service Response:

Copies of the TLMP Revision Supplement to the Draft EIS (TLMP Draft Revision, 1991) are readily available from the Tongass Land Management Planning Team, 8505 Old Dairy Road, Juneau, AK 99801 or by calling (907) 586-8700. Copies of TLMP and other Federal documents are also available at local community libraries and Forest Service offices. The TLMP Draft Revision EIS's have had two formal public comment periods totalling 9 months.

23. BETTER UNIT CARDS

Public respondents felt that the unit cards needed to be more site specific and rely less on generic input from resource specialists. Some respondents indicated the unit cards were valuable to the analysis and were an improvement over previous efforts.

Letters and Comments on this Subject Included:

020 021 083 303 105 112 114 302

Examples Include:

"The Forest Service apparently is relying on the unit cards to provide the site-specific information and analysis required by NEPA. However, many of the specialists' recommendations appear to be generic and only minimally site-specific. This lack of information precludes a meaningful, site-specific analysis of the impacts from this proposed project." 021

"Providing unit cards is a big improvement over other EIS's. However,...there are a number of errors." 112

"We are pleased to see the initial version of unit cards for potential cutting areas. Although they are currently preliminary in nature, they are helpful where more detailed reviews are necessary. These unit cards seem to be better and more site-specific than previous Phase I cards we have reviewed. However, there appear to be some problems in the GIS mapping program, as some contour lines and streams extend over lakes, etc.

"As more field work is accomplished and changes are made in roading and logging plans from what is shown on the phase I cards, we would like to be able to track those changes and evaluate their effect upon fish and wildlife habitats and cumulative impacts. Consequently we asked to be kept apprised of changes to CPOW unit cards if and when they occur.

"Additionally, some specific unit cards will eventually need to be examined in greater detail, especially as specialists reports become available and more site-specific information is developed." 302

Forest Service Response:

Between the Draft and Final EIS there has been substantial improvement in both sides of the unit cards, i.e., the written comment side and the map side. Field reconnaissance during the 1992 field season has greatly improved site specificity and has reduced reliance on more generic comments.

24. BETTER MAPS

Some respondents offered suggestions for improving the quality and content of maps for the FEIS and ROD.

Letters and Comments on this Subject Included:

020 021 083 134

Examples Include:

"Maps of retention and high volume. All retention should be mapped, not just retention 'that will be managed to provide old-growth habitat conditions for the sale.'... The Existing Condition map is unusable, because of poor quality and the fact that the alternatives maps cannot be overlaid on it. Without the ability to see the characteristics of the acres proposed for cutting, the Existing Condition map gives little information. Maps should be of acetate, to permit overlay. Alternatively, the agency should produce, say, 10-20 sets of these maps and make them available on loan to interested members of the public. Clearcuts should be depicted in brown, not green." 020

"We also seriously question the accuracy of the maps provided with the DEIS given the amount of modifications to units under the 1989-94 Operating Plan and the likelihood that the GIS was not always updated to reflect those changes. Special attention should be given to the comments submitted by Brenda E. Wright which identify several inaccuracies with the maps." 021

"The detailed information on cutting units and proximity to anadromous streams is very valuable. We commend you on the patience and effort it has taken to store and retrieve so much information in your geographic information system. It is our opinion monitoring of the harvest will proceed much smoother as result. Though the detail is admirable we noted several inconsistencies between phase cards and the large scale maps." 083

Forest Service Response:

The Forest Service appreciates site-specific comments from the public that have pointed out inaccuracies with maps presented in the DEIS. All maps accompanying the FEIS and ROD use the most current information available and correct all site-specific errors identified from field reconnaissance and from public comment.

In response to comment #020, "All retention should be mapped," all the requested areas were displayed on the Existing Condition Map included with the DEIS. The confusion possibly arises from a discrepancy in terms between the commonly used term "old-growth retention" and the legend statement "Areas identified in 1989-94 LTS EIS that will be managed to provide old-growth habitat conditions for the sale," which matches exactly with the legend used for the 1989-94 LTS. While the terms are interchangeable, the Forest Service prefers the latter definition because it emphasizes that these areas are to be maintained for the life of the project and not in perpetuity. See also response to #3L. The Retention as designated in the ROD is also displayed in the map packet on the map titled "Old-Growth Prescription."

25. IMPROVE CUMULATIVE EFFECTS ANALYSIS for whole POW, including intra-project and non-National Forest System lands

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Respondents cited a concern to improve the cumulative effects analysis to include concurrent EIS projects on adjacent lands, as well to include the effects of activities on adjacent non-National Forest System land.

Letters and Comments on this Subject Included:

020 021 114 121 122 126-128 131 134 302 KT8 KT9

Examples Include:

"Analysis of cumulative impacts in the EIS is absolutely inadequate. The discussions of cumulative impacts for individual resources are scattered in the document and are not considered cohesively. Also, essentially no consideration is given to the contribution of this plan to cumulative impacts arising from past and future timber cutting in adjacent areas (or other related areas) of the national and private forest lands." 114

"The DEIS fails to address the cumulative effects the proposed action, in conjunction with adjacent past, proposed, or probable future timber sales, would have on wildlife populations, and sport and subsistence hunting." 134

"Cumulative effects analysis should take into account the impacts on neighboring areas as we requested in our scoping comments; particularly because two other large timber sales, Lab Bay and Polk Inlet, are scheduled concurrently to the immediate north and south of the CPOW area. The combined effects of these enormous projects on the island's wildlife and ecosystems must be displayed. Such site-specific analysis was not done in TLMP and can only be done at the project level." 302

Forest Service Response:

The cumulative effects analysis for the CPOW Project Area displayed in Chapter 3 of the DEIS has been rewritten and strengthened. The final analysis includes cumulative impacts of all known timber management activities in and adjacent to the CPOW Project Area, including public and private land. Cumulative effects of other future projects on POW have been analyzed and displayed in the TLMP Draft Revision, which is incorporated in this project by reference.

26. MITIGATION AND MONITORING NEEDS IMPROVEMENT AND FULL DISCUSSION

This issue reflects public concern that monitoring plans and mitigation measures should be expanded and improved.

Letters and Comments on this Subject Included:

003 007(19) 017 020 021 030 036 064(2) 068 084 092 098 107 108 112 113 114 115 121 124 128 129 130 134 282 299 301 302 303 306 KT3 KT4 KT5

Examples Include:

"Have any streams had pre- and post-harvest water temperature monitoring?" 017

"A glaring omission is that there is no MIS (Management Indicator Species) monitoring contemplated." 020

"The monitoring requirements proposed for TTRA stream buffers is completely inadequate." 021

"Claiming that road closures are an effective mitigation measure is deceptive, since these closures seldom take place." 112

"... I recommend that the Central Prince of Wales logging plan include fish weirs or other accurate counting devices be established to monitor returning runs of salmon." 113

"The monitoring plan offered at the end of Chapter 2 of the EIS is inadequate.... Mitigation is weak." 114

"In your monitoring to determine if the management objectives were reached, I suggest that you monitor to assure the cost effectiveness plan for this project is maintained." 115

"In most cases where harvest has occurred on Prince of Wales Island, minimal mitigation for wildlife has been applied." 128

"Each plan for monitoring wildlife habitat or nest sites states the Corrective Action is to consult with the responsible party. The Final EIS should include plans for implementation of measures, including legal action if necessary, that would offset or compensate for encroachment upon wildlife habitats or nest areas. We recognize a specific plan for each situation cannot be included in the EIS; however, a general statement of mitigation actions should be included. Additionally, the measures should be included as terms of the sale contracts." 134

Forest Service Response:

Implementation and effectiveness monitoring of water quality, fish, and wildlife protection measures is planned (See FEIS, Chapter 2). The monitoring plan has been expanded and strengthened in the FEIS. Monitoring will include an evaluation of implementation of Best Management Practices for the protection of water quality and the implementation and effectiveness of stream buffers to protect water quality and stream habitat.

Monitoring is also conducted on the Forest Plan level, providing the public, the Regional Forester, and Ketchikan Area managers with information on the progress and results of implementing the Forest Plan. The Forest level monitoring plan is not intended to replace monitoring developed in the CPOW Project planning process or other ongoing monitoring activities. Specific project monitoring requirements will continue to be determined in the project NEPA process.

Mitigation measures are site-specific management activities to reduce the adverse impacts of timber harvest, road construction or other development activities. The CPOW project uses unit cards to display appropriate mitigation measures which will be applied on a site-specific basis. Mitigation measures will be monitored during and after project implementation to determine whether the practices were implemented as designed and whether they comply with the Tongass Land Management Plan. Planning for implementation monitoring began with the design of the CPOW Project and continued throughout project development. Implementation monitoring is part of the administration of the timber sale contract. Sale administrators, road inspectors, and resource specialists assure that mitigation measures contained on unit and road cards are implemented.

Implementation monitoring will be conducted on a variety of mitigation measures, including TTRA stream buffers, other stream buffers, slope stabilization and erosion control, eagle nest buffers, wildlife snags, Steller sea lion habitats, trumpeter swan wintering areas, beach fringes, estuary fringes, and riparian habitat.

The effectiveness of mitigation measures will be evaluated by monitoring proposed in the FEIS (See Chapter 2). "Effectiveness monitoring" seeks to find out how well the design features or mitigation measures worked to protect natural resources and their beneficial uses. Proposed effectiveness monitoring for all alternatives includes the monitoring of timber, visual resources, roads, log transfer facilities, water quality, fish habitat, wildlife, cultural resources, and cave resources.

Results of effectiveness monitoring are evaluated and, if necessary, practices are adjusted and refined to better meet management objectives.

27. PRIVATIZATION OF NATIONAL FOREST SYSTEM LANDS

One respondent felt National Forest System lands could be better managed by private industry.

Letters and Comments on this Subject Included:

069

Examples Include:

"An alternative that I never see is privatization. It would be very revealing to see the dollar return of a gradual liquidation sale of USFS lands to private people and industry. This alternative would be much cheaper and more lucrative to the U.S. taxpayer. This would also put more lands on the tax rolls, reduce the national debt and stimulate the private sector." 069

Forest Service Response:

There is no legal basis for the Forest Service to sell lands belonging to the National Forest System to the extent the respondent suggests. Even if National Forest System lands on the Tongass National Forest were made private, that would not release the Forest Service from honoring the Ketchikan Pulp Company 50-Year Timber Sale Contract (see response #21a). Privatization is beyond the scope of this project-level analysis.

28. TRUTH AND OBJECTIVITY QUESTIONED

Respondents felt the NEPA process which produced the CPOW DEIS was driven by political pressure to justify a predecisional course of action, and that truth and objectivity suffered.

Letters and Comments on this Subject Included:

013 028 112 113 134

Examples Include:

"I feel the CPOW FEIS needs to more objectively display analysis, especially on issues which may question the proposed action." 013

"The persons managing the IDT leaders tend to more manage the direction of the results than to let the results fall where they may. This redirecting process tends to negate the analysis process as far as credibility is concerned." 028

"The Forest Service has an obligation to inform the public in an honest and straightforward manner, rather than using half-truths and misrepresentations." 012

"The DEIS appears biased in some areas due to the selected use of plausible and empirical statements.... We suggest the Final EIS be made as objective as possible." 134

Forest Service Response:

Both the DEIS and FEIS objectively display the social, economic, and resource effects on the human environment. The analysis of effects was conducted and the EIS written by an interdisciplinary team, including Forest line and staff officers.

29. NO GARBAGE DUMP IN GOOSE CREEK/THORNE RIVER DRAINAGES

This respondent was against the proposed construction of a garbage dump upstream from Thorne Bay.

Letters and Comments on this Subject Included:

125

Examples Included:

"No garbage dump in the Goose Creek/Thorne River drainage." 125

Forest Service Response:

This action is on State land where the Forest Service has no jurisdiction. Therefore, this issue is outside the scope of this document. The public is encouraged to contact local and State agencies to make their concerns known.

30. NOISE POLLUTION

This respondent was concerned about noise from helicopters during yarding operations.

Letters and Comments on this Subject Included:

306

Examples Include:

"The final EIS should indicate the number of days and the hours of helicopter operation. Helicopters at 500 feet are comparable to sound levels of heavy trucks and city buses heard from the street, which could be considered a significant impact in areas with very low ambient noise levels. The levels and character of noise that would be expected from helicopter operations in the vicinity should be described." 306

Forest Service Response:

The FEIS (Chapter 3) has been re-written to include this information.

REFERENCES FOR APPENDIX D

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36 CFR. See National Forest Management Act.

40 CFR. See National Environmental Policy Act (NEPA).

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Sampson et al. 1991. New Perspectives in Alaska Forest Management. 1991 North American Wildlife Conference. Edmonton, Alberta, Canada.

TLMP 1979. See USDA Forest Service 1979.

TLMP Draft Revision. See USDA Forest Service 1991.

Tongass Timber Reform Act (TTRA). 1990. Public Law 101-626.

TRUCS. 1988. See Kruse and Frazier 1988.

USDA Forest Service. Forest Service Handbooks:
FSH 2409.17, Silvicultural Practices Handbook.
FSH 2409.18, Sale Preparation Handbook. R-10 Supplement No. 2409.18-91-1.
R-10 Supplement No. 2409.18-92-5.
FSH 2509.22, Soil and Water Conservation Handbook
FSH 2609.24, Aquatic Habitat Management
FSH #462, National Forest Landscape Management

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_________. 1979. Tongass Land Management Plan and Final EIS. Series No. 10-57. Alaska Region, Juneau. Amended 1986 (Administrative Doc. No. 147) and 1991 (R10-MB-96 and R-10-MB-97).

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APPENDIX E

Changes to Units

Central Prince of Wales Final Environmental Impact Statement

APPENDIX E
Changes to units based on site specific information

Between the Draft EIS and the Final EIS, there have been many site-specific changes made to proposed unit boundaries. These changes resulted from field reconnaissance, including: logging/transportation feasibility, silvicultural prescription, cave survey, soils exams, fish habitat survey, and cultural resource surveys. These changes to unit boundaries are quantified and summarized in the following table.

	DEIS			FEIS			
Unit	ac	vol	log	ac	vol	log	REASON
549.2-201	31	561	HU	23	300	SSB	Fish, partial cut
549.2-205	29	581	HU	16	252	SSU	Fish, partial cut
549.2-206	37	681	HU	0	0		Deleted for caves
549.2-207	20	410	HD	20	410	SSB	
549.2-230	31	678	SSB	31	698	SSB	
550-206	16	475	HU	16	456	SSU	Low volume
550-208	20	378	HU	18	438	HU	
550-209	34	776	HU	0	0		Deleted for soils
550-211	44	976	HB	44	976	SSB	
550-213	39	847	LSU	37	788	LSU	Low volume
550-214	20	564	HD	0	0		Deleted for caves
550-215	37	1315	HB	37	1279	SSB	
550-218	57	1264	HB	67	1006	SSB	Unit expansion, streams
550-220	62	1578	SSU	40	914	SSD	Road location
550-221	30	832	SSU	21	594	SSD	Road location, streams
550-222	24	653	SSB	11	297	SSB	
550-227	71	2299	HU	71	2329	SSB	
550-228	49	1665	SSB	22	782	SSB	Caves
550-230	104	3374	SSB	0	0		Deleted for caves
550-237	36	755	HB	27	547	SSB	Road location
550-238	22	566	HB	22	566	SSB	
550-239	95	2888	SSB	58	1987	LSB	Caves
551-238	30	661	SSU	33	440	SSU	
551-249	75	1674	LSU	69	1714	LSU	
551-250	35	681	HU	33	681	HU	
551-253	29	541	HD	21	380	HD	Fish
551-254	47	1260	SSU	25	597	SSU	
552-201	60	1401	LSU	53	1150	LSU	Fish
552-202	55	1721	SSU	51	1477	SSU	
552-203	35	744	SSU	33	681	SSU	
552-204	23	482	SSU	22	440	SSU	
552-206	44	1127	HU	42	1026	HU	
552-207	22	481	HU	21	439	HU	
552-211	64	2054	SSB	53	1535	SSB	

Unit	DEIS ac	DEIS vol	DEIS log	FEIS ac	FEIS vol	FEIS log	REASON
552-212	96	2395	SSU	89	1994	SSU	
552-213	32	1049	SSU	31	921	SSU	
552-214	27	547	HB	27	500	HB	
552-215	18	372	HB	17	340	HB	
552-216	36	1147	SSU	33	980	SSU	
552-217	79	1702	HB	79	1522	HB	
552-218	31	820	HU	16	398	HU	Fish
552-219	52	1497	SSU	40	1111	SSB	Fish
552-220	74	1542	SSU	62	1127	SSU	Low volume
552-221	56	1808	SSU	55	1633	SSU	
552-223	28	781	HU	28	678	HU	
552-224	68	1608	HU	68	1399	SSU	
552-226	16	366	HU	16	300	HU	
552-227	40	935	HB	39	780	SSB	
552-258	19	438	HU	14	280	SSU	Fish
552-259	44	1066	HU	29	670	SSB	Fish, streams
552-262	28	972	HU	28	849	HU	
552-269	43	1094	HU	27	666	SSU	Fish
552-270	20	524	HU	19	475	SSU	
552-271	30	991	HB	25	744	HB	
552-273	24	990	SSU	12	391	SSU	Fish
553-200	51	1051	HU	51	1116	HU	
553-201	27	569	HU	27	591	HU	
553-202	67	1467	HB	67	1488	HB	
553-208	31	657	HU	25	525	HU	
553-209	19	394	HU	26	394	HU	Unit expansion
553-211	50	1051	SSU	43	897	SSU	Fish
553-215	18	350	HU	18	328	HU	
553-216	43	897	HU	42	897	HU	
553-219	41	876	HB	40	705	HB	partial cut
553-221	34	1006	HB	34	1082	SSB	
553-222	65	1423	HB	65	1423	SSB	
553-228	35	1028	SSB	34	896	SSB	partial cut
553-232	86	2220	SSU	81	2088	SSU	Streams
553-235	33	733	SSU	47	733	SSU	Unit expansion

Unit	DEIS ac	DEIS vol	DEIS log	FEIS ac	FEIS vol	FEIS log	REASON
553-237	45	810	SSU	45	941	SSU	
553-238	75	1990	SSB	67	1837	SSB	
553-239	37	1038	SSU	37	836	SSU	partial cut
553-245	39	820	SSB	33	895	SSB	Fish
554.2-200	54	919	SSU	45	876	SSU	
554.2-201	18	317	HB	23	372	HB	
554.2-206	46	1497	HU	0	0		Deleted for wildlife
554.2-210	23	927	HU	23	622	HU	
554.2-213	26	650	HU	17	388	HU	
554.2-214	46	1203	H	0	0		Deleted fish
554.2-215	27	819	SSB	40	874	SSB	Unit expansion
554.2-220	61	2464	HU	31	1218	HU	Fish, streams
554.2-225	25	547	HU	25	228	SSU	partial cut
557-200 B	77	2593	SSU	46	1620	SSU	Cultural resources, streams
557-201	34	1101	SSU	0	0		Deleted caves
557-202	42	1542	SSU	0	0		Deleted caves
571-205	25	482	SSU	20	394	SSU	Streams
571-209	17	372	HB	10	219	HB	Streams
571-210	62	1454	LSU	49	1345	LSU	Fish, streams
571-211	17	557	HU	10	328	SSU	
571-213	49	1345	HB	37	1017	HB	Fish, streams
571-225	11	396	HB	11	273	HB	
571-226	51	1370	HU	48	1392	HU	
571-227	123	2670	HU	111	2397	LSU	
571-235	23	754	SSU	23	776	SSB	Streams
571-252	50	2541	HB	43	1555	HB	Fish, partial cut
571-253	90	4118	SSB	72	3395	SSB	Fish, streams
571-256	43	1599	SSU	39	1446	SSU	Streams
571-257	66	2201	SSD	55	2053	SSD	Fish, streams
571-258	47	1359	HB	45	1308	HB	Fish
571-260	61	2252	HU	51	2078	SSU	Streams
571-265	31	1474	SSU	0	0		Deleted for landline
571-266	72	3659	LSU	56	2795	LSU	Caves
571-267	47	2338	SSU	25	1169	SSU	Caves, streams
571-268	63	3202	SSB	19	1067	SSB	Streams
571-274	28	1423	HU	29	1270	HU	
572-211	59	1433	HU	89	1761	SSB	Unit expansion, streams
572-212	59	2041	HU	47	897	SSB	Unit expansion
572-221	68	711	SSU	39	315	SSB	Fish, partial cut

Unit		DEIS ac	DEIS vol	DEIS log	FEIS ac	FEIS vol	FEIS log	REASON
572-222		40	1364	SSB	31	924	SSB	Fish
572-226		30	889	H	26	731	SSB	Fish
573-203		41	908	HU	37	788	HU	Streams
573-206		73	1907	HU	53	1334	HU	
573-210		21	633	HB	21	595	HB	
573-225		34	879	SSB	33	879	SSB	
573-227		56	1574	SSU	44	1159	SSU	Fish
573-228		29	842	HB	34	995	SSB	Unit expansion
573-231		41	1093	HU	40	1006	HU	
573-237	A	14	479	H	53	1116	SSB	Unit expansion
573-237	B	14	479	HB	14	479	SSB	
573-239		28	700	SSU	28	618	SSU	partial cut
573-240		40	886	HU	36	788	HU	
573-241		37	1115	HU	37	934	HU	partial cut
573-242		66	1739	HB	42	1115	SSB	
573-244		71	2342	SSB	71	2342	LSB	
573-249		34	918	H	34	643	H	partial cut
573-250		26	787	SSB	25	721	SSB	
573-251		26	678	H	26	490	H	partial cut
573-260		20	713	SSD	17	680	SSD	Streams
573-264		67	2365	SSB	51	1788	SSB	
573-268		66	1957	SSU	77	2457	SSU	Unit expansion
573-270		62	1713	SSU	53	1571	SSU	
573-274		54	1655	SSB	51	1655	SSB	
573-275		32	983	HB	19	412	HB	
573-289		69	2482	HB	69	2482	SSB	
573-296		73	2640	HU	56	2002	HU	Fish
573-297		61	1887	HB	60	1535	HB	partial cut
573-308		57	1764	H	57	1786	H	
573-314		110	3377	HU	97	1285	HU	Fish, partial cut
574-210		28	711	SSB	40	886	LSB	Unit expansion
574-224		74	1793	SSB	65	1651	SSB	Streams
574-228		65	1690	SSB	43	1113	SSB	Road location, partial cut
574-238		64	1563	HD	54	1509	SSB	Fish
574-239		57	1563	H	58	1110	H	partial cut
574-247		75	2485	H	71	2485	H	
574-248		47	1572	H	45	1572	H	
577-200		45	1228	SSU	36	1070	SSU	Streams

Unit		DEIS ac	DEIS vol	DEIS log	FEIS ac	FEIS vol	FEIS log	REASON
577-201		33	722	HB	31	657	HB	
577-204		23	688	HB	21	721	HB	
577-205		55	1301	SSB	30	624	SSB	Streams
577-205	B	51	1236	SSU	46	1126	SSU	Streams
577-214		46	1585	SSB	37	1055	SSB	Caves
577-278		24	514	HU	23	514	HU	
577-280		18	416	HB	10	230	SSD	Road location
577-281		27	852	HB	20	623	SSB	Road location
577-284		48	1541	HU	45	1434	HU	partial cut
577-286		52	1709	HB	46	1501	HB	Streams
577-316		39	1183	SSB	21	773	SSB	Fish, streams
577-317		79	2401	SSB	47	1522	SSB	Fish
577-320		34	951	HU	31	918	SSU	
579-201		56	1182	HB	51	1073	HB	
579-202		15	492	HB	0	0		Deleted for fish
579-203		56	1585	HB	56	1585	SSB	
579-205		69	1738	HU	69	1848	LSD	
579-208		54	1160	HB	51	1160	HB	
579-209		79	1718	SSU	55	1226	SSU	
579-212		33	1038	HB	33	1038	HB	Fish
579-213		41	1071	HU	41	819	HU	
579-215		32	875	HB	30	875	HB	
579-216		65	1673	HB	62	1695	HB	
579-218		50	1006	HB	50	1410	SSB	
579-219		28	624	HB	27	624	HB	
579-220		51	1606	HU	46	1442	HU	
579-223		41	951	HU	32	711	HU	Fish
579-224		40	995	HU	31	656	HU	
579-229		47	1697	SSB	45	1620	SSB	
580-200		20	638	H	20	420	H	partial cut
580-201		25	482	H	37	744	H	Fish
580-202		25	754	SSU	18	546	SSB	Road location
580-212		69	1946	H	47	1421	H	Soils
580-213		80	2524	H	63	2065	H	Soils
580-218		67	1565	H	74	1586	H	Unit expansion
580-219		41	1148	SSB	39	1137	SSB	

Unit		DEIS ac	DEIS vol	DEIS log	FEIS ac	FEIS vol	FEIS log	REASON
580-221		61	1929	H	61	2033	H	Soils
580-227		41	1560	SSB	56	1908	SSB	Fish
580-227	B	28	1066	SSD	27	1066	SSD	Soils
580-230		31	831	SSB	40	842	SSB	Unit expansion
580-235		58	1718	SSB	53	1571	SSB	
580-239		53	1737	H	31	1082	LSB	Soils
580-242		33	1346	SSD	0	0		Deleted for riparian
581-200		21	656	SSD	78	1607	LSB	Unit expansion
581-201		13	426	HB	13	426	SSB	
581-202		12	262	HD	12	295	SSB	
581-204		46	1618	HU	27	852	HU	Fish
581-204	B	35	1202	SSB	35	1202	SSB	Fish
581-218		23	747	SSU	23	747	LSB	
581-219		40	1235	H	21	656	H	
581-232		27	787	H	26	700	SSB	
581-234		44	1648	H	6	228	H	Soils
581-241		37	1296	H	34	1157	H	Soils
582-211		38	1255	SSB	32	1081	SSB	Fish
582-214		35	1620	HB	40	1988	SSB	Unit expansion
582-215		72	2957	HB	77	3417	SSB	Unit expansion, streams
582-218		68	2950	H	46	2210	H	
553-236		37	962	SSU	37	940	SSU	
583-214		10	219	HB	10	248	SSB	
583-215		59	1307	H	45	1056	H	Low volume
583-216		83	2303	H	77	2379	H	
583-225	B	24	913	H	42	1529	H	Unit expansion
583-227		40	810	HB	29	635	HB	Low volume
583-229		53	1160	HU	53	1182	SSB	
583-233		37	1066	H	36	1044	H	
583-242		65	2098	H	62	2065	H	
583-243		64	1695	H	61	1695	H	
583-256		38	810	SSB	31	657	SSB	
583-258		80	1946	LSB	80	1596	SSB	partial cut
584-218		69	1760	H	57	1629	SSB	Low volume
584-220		44	951	HU	17	383	SSB	Streams
584-220	B	54	1443	HB	35	1006	SSB	Streams
584-226		49	1083	H	49	1083	LSB	
584-227		57	1182	H	46	941	LSB	
584-239		43	1224	H	0	0		Deleted for soils
584-245		35	1082	H	35	1082	H	
584-248		32	983	H	0	0		Deleted for soils

Unit		DEIS ac	DEIS vol	DEIS log	FEIS ac	FEIS vol	FEIS log	REASON
584-250		52	1650	HU	48	1585	SSU	
584-251		67	1445	HU	56	1215	HU	Fish
584-252		27	885	HU	25	787	HU	
584-254		47	1192	H	47	1290	H	
584-263		33	842	HU	48	1236	SSB	Unit expansion
584-272		140	4142	H	132	2922	H	partial cut
585-201		32	940	HB	50	1031	SSB	Unit expansion, partial cut
585-202		37	919	HU	31	733	SSB	
585-203		35	842	HU	42	882	SSB	Unit expansion, partial cut
585-204		35	864	HU	29	552	HU	Fish, partial cut
585-206		32	984	SSU	25	636	SSU	Fish, partial cut
585-208		35	799	HB	23	558	HB	Fish, streams
585-210		26	503	HU	19	416	HU	
585-214		15	328	HU	10	241	HU	Streams
585-215		31	973	HU	31	856	HU	partial cut
586-216		9	284	HU	9	295	HU	
586-218		49	1323	HB	20	514	HB	Fish
586-218	B	46	1148	HB	44	1115	HB	Fish
586-220		50	1225	HU	50	1247	HU	
586-225		61	1520	SSU	52	1335	SSU	Fish
586-226		61	1716	SSU	58	1749	SSU	
586-227		78	2557	SSU	63	2065	SSU	
586-228		103	2766	SSU	97	2777	SSU	
586-229		22	590	HU	22	623	SSU	
586-232		55	1714	SSU	55	1506	SSU	
587.1-206		44	1210	HB	40	1083	HB	Streams
587.1-208		50	1181	LSU	51	952	LSU	
587.1-209		43	1403	HB	40	1024	HB	Fish, partial cut
587.1-210		31	679	HB	23	482	HB	Streams
587.1-212		18	632	SSU	36	777	SSU	
587.1-214		35	755	SSU	0	0		Deleted for cultural
587.1-220		42	854	HB	17	372	HB	Fish
587.1-221		37	1294	SSB	36	1327	SSB	
588-201		60	1629	SSB	52	1411	SSB	Streams

Unit		DEIS ac	DEIS vol	DEIS log	FEIS ac	FEIS vol	FEIS log	REASON
588-203		74	2175	LSB	62	1716	SSB	Road location
588-204		72	2120	H	94	2393	LSB	Unit expansion
588-212		59	1877	HU	10	349	HU	
588-212	B	59	1909	HB	58	1262	HB	partial cut
588-213		63	1841	HB	10	381	HB	Fish
588-213	B	58	1705	HU	57	1373	HU	Fish, partial cut
588-215		32	1575	HB	28	631	HB	
588-215	B	32	1575	HU	32	926	HU	partial cut
588-216		39	1246	HB	42	1278	HB	
588-219		21	404	HB	21	682	HB	
588-225		62	1967	SSB	0	0		Deleted for research
588-226		15	219	HU	0	0		Deleted for research
588-231		26	774	HB	20	632	HB	Fish
588-237		41	1280	HB	0	0		Deleted for riparian
588-241		40	832	HB	33	700	HB	Streams
588-249		29	775	HB	52	1246	HB	
588-249	B	29	775	SSU	23	612	SSU	
588-257		40	1168	HU	34	918	HU	
588-259		49	1377	HU	47	1147	SSB	Caves
588-260		11	295	HU	9	361	HU	
588-263		47	1360	HB	47	1338	HB	
588-268		48	1569	LSB	42	1552	LSB	Streams
588-269		67	2182	LSB	64	2247	LSB	
588-270		69	2168	LSU	66	2201	LSU	
588-276		51	1676	SSU	48	1610	SSU	Streams
588-277		62	2054	LSU	44	1530	H	Streams
588-278		54	1770	H	35	1213	H	Soils, streams
588-279		84	2754	H	57	1967	H	Soils
588-283		79	2480	H	76	1713	H	partial cut, streams
588-285		68	1913	H	49	1410	LSB	Soils, streams
588-286		31	657	SSB	35	908	SSB	Streams
588-287		56	1716	SSB	39	1137	H	Streams
588-295		35	1215	H	24	839	H	Fish, streams
588-300		62	2349	H	48	1969	H	Soils, streams
588-301		25	596	H	37	1172	H	Streams
588-302		99	3681	SSB	69	2746	LSU	Streams
588-304		23	817	H	25	887	LSU	
588-305		55	2203	H	33	1408	H	Fish
588-306		63	2212	H	58	2065	H	Soils
588-310		78	2716	H	59	2242	LSB	Streams
588-312		64	2306	HB	52	2034	SSB	Streams

Unit		DEIS ac	DEIS vol	DEIS log	FEIS ac	FEIS vol	FEIS log	REASON
588-322		139	4273	HB	140	4240	HB	
588-324		109	2560	HB	92	2177	SSB	Streams
588-327		117	4040	H	111	4824	H	
589-203		47	1388	H	45	1388	H	
589-204		58	1596	H	55	1596	H	
589-205		29	842	H	28	842	H	
589-214		31	842	HB	24	656	HB	Streams
589-218		31	689	HB	31	689	HB	
589-220		35	679	H	34	700	SSB	
589-229		50	1094	SSB	40	854	SSB	Soils, streams
589-230		55	1138	HB	54	1138	HB	
589-231		30	635	HB	30	635	HB	
589-232		45	1192	HB	37	1028	HB	Streams
589-233		57	1487	HB	52	1400	SSB	
589-236		35	962	H	33	929	H	
589-238		33	907	H	31	885	H	
589-257		118	3872	SSU	109	3707	SSU	Streams
589-262		60	1745	H	40	1278	SSB	Streams
589-263		8	175	HD	9	197	HD	
589-271		31	668	H	32	722	H	
589-273		93	2055	H	77	1749	LSB	Streams
589-274		99	2842	SSB	73	2219	LSB	Fish, streams
589-275		27	688	HB	20	524	HB	Fish, streams
590-201		49	1551	H	49	1617	H	
590-210		76	2230	H	69	1538	H	partial cut, streams
590-211		53	1644	H	37	845	H	partial cut
590-217		81	2722	LSB	81	2760	LSB	partial cut
590-219		36	1098	H	36	769	H	
590-229		65	1776	H	62	1776	H	
590-230		47	1259	H	45	1259	H	
590-231		84	3348	H	82	2333	H	partial cut
590-243		103	3206	H	98	3206	H	
590-244		86	2481	H	86	2459	H	
590-246		73	2085	HB	56	1430	SSB	Fish
590-276		79	2132	SSB	72	1989	SSB	Streams
598-203		44	1254	HB	27	779	SSB	Fish, streams
598-205		54	1160	SSB	46	1007	SSB	Streams
598-206		26	569	HU	18	416	SSB	Streams
598-207		58	1965	HB	89	2852	HB	
598-207	B	59	2038	LSU	55	1780	LSU	

Unit		DEIS ac	DEIS vol	DEIS log	FEIS ac	FEIS vol	FEIS log	REASON
598-218		58	1296	HB	41	897	HB	Fish
598-220		122	2429	HU	89	1955	HU	Streams
598-222		13	399	HU	31	950	HU	
598-222	B	13	469	SSU	11	437	SSU	
598-233		45	1181	HU	38	984	HU	Fish
598-238		31	759	HU	31	657	HU	
598-245		38	782	HB	29	591	HB	
598-249		72	2593	SSB	63	2261	SSB	Fish, streams

Other changes to units may be attributed to:

1. Correction of mapping errors where slivers of units extended into buffers for streams, beach fringe, or estuaries.
2. Change in volume class distribution affecting formula by which volume is calculated. For example, unit 551-238 was displayed in the Draft EIS at 30 acres with 33 acres of volume class 4; the same unit in the Final EIS displays 33 acres with 22 acres of volume class 4. This is caused by modifications to GIS data coverages.

Logging system abbreviations

HD	highlead downhill
HU	highlead uphill
HB	highlead uphill and downhill
SSD	small skyline downhill
SSU	small skyline uphill
SSB	small skyline uphill and downhill
LSD	slackline downhill
LSU	slackline uphill
LSB	slackline uphill and downhill
H	helicopter

APPENDIX F

Subsistence and Biodiversity Maps

Central Prince of Wales Final Environmental Impact Statement

Tongass National Forest
Important Subsistence Use Areas

SOURCE: Tongass Resource Use Cooperative Survey (TRUCS), 1989

TONGASS NATIONAL FOREST
IMPORTANT SUBSISTENCE
USE AREAS

SUBSISTENCE AREAS

**OURCE: Tongass Resource
se Cooperative
urvey. - Feb.1989**

THORNE BAY

TONGASS NATIONAL FOREST IMPORTANT SUBSISTENCE USE AREAS

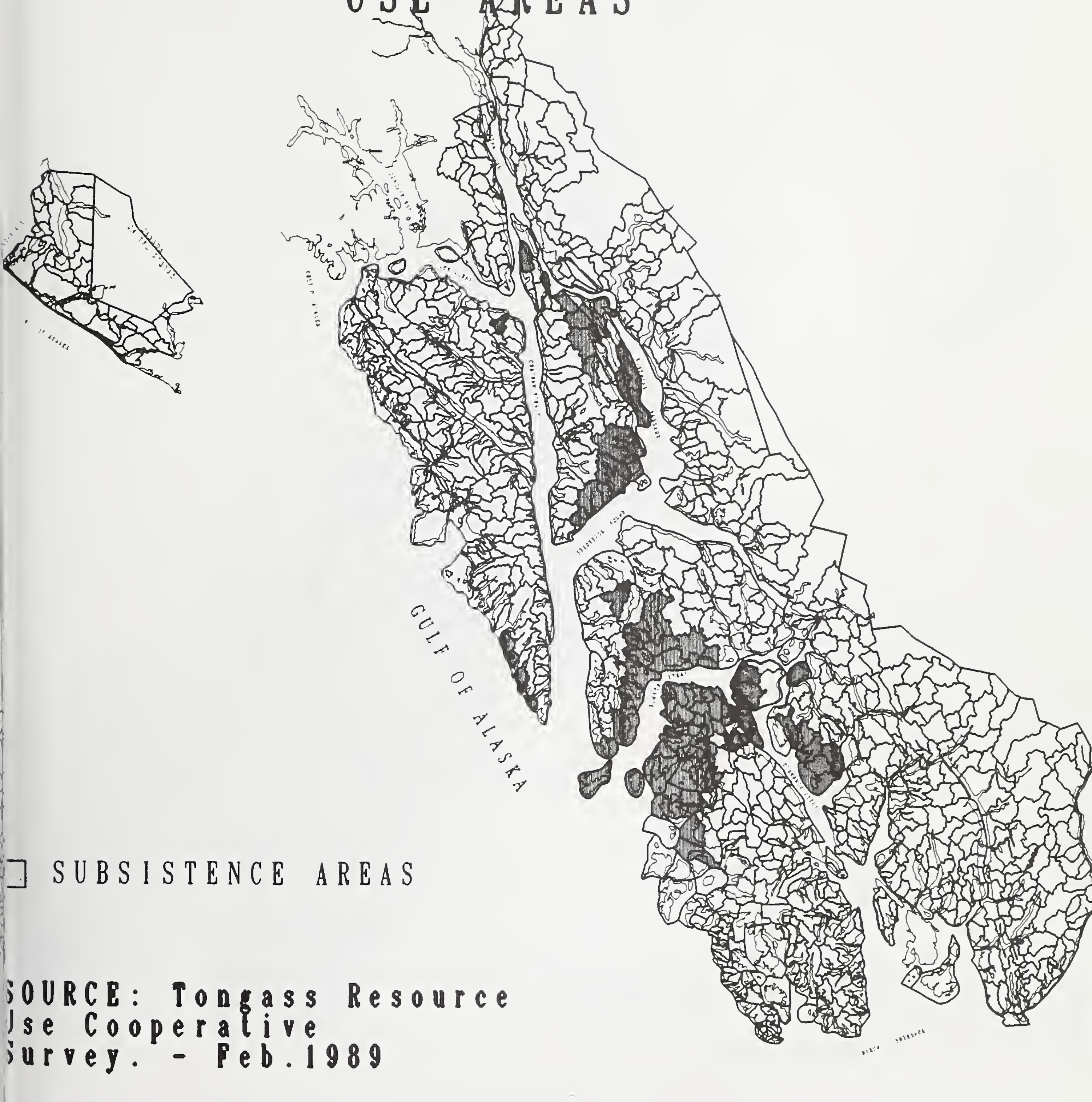
☐ SUBSISTENCE AREAS

SOURCE: Tongass Resource Use Cooperative Survey. - Feb.1989

PORT PROTECTION

April 20, 1990

TONGASS NATIONAL FOREST IMPORTANT SUBSISTENCE USE AREAS



☐ SUBSISTENCE AREAS

SOURCE: Tongass Resource Use Cooperative Survey. - Feb.1989

PT. BAKER

TONGASS NATIONAL FOREST IMPORTANT SUBSISTENCE USE AREAS

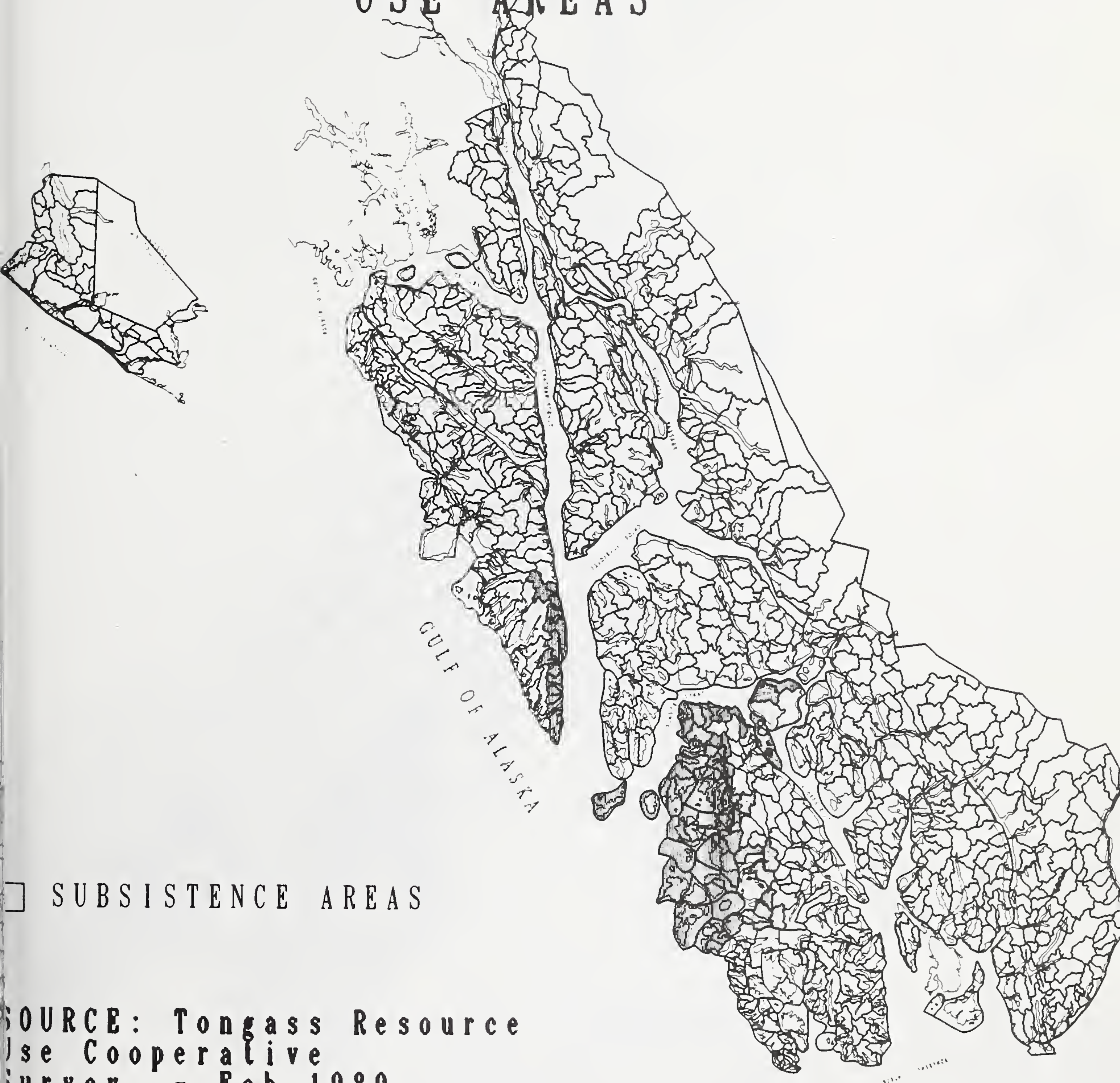
☐ SUBSISTENCE AREAS

SOURCE: Tongass Resource Use Cooperative Survey. - Feb.1989

CAPE POLE

April 19, 1990

TONGASS NATIONAL FOREST
IMPORTANT SUBSISTENCE
USE AREAS



☐ SUBSISTENCE AREAS

SOURCE: Tongass Resource Use Cooperative Survey. - Feb.1989

EDNA BAY

April 19, 1990

TONGASS NATIONAL FOREST IMPORTANT SUBSISTENCE USE AREAS

SOURCE: Tongass Resource Use Cooperative Survey. - Feb.1989

SAXMAN

April 20, 1990

TONGASS NATIONAL FOREST IMPORTANT SUBSISTENCE USE AREAS

] SUBSISTENCE AREAS

OURCE: Tongass Resource se Cooperative urvey. - Feb.1989

WRANGELL

April 20, 1990

TONGASS NATIONAL FOREST IMPORTANT SUBSISTENCE USE AREAS

☐ SUBSISTENCE AREAS

SOURCE: Tongass Resource Use Cooperative Survey. - Feb.1989

CRAIG

April 19, 1990

TONGASS NATIONAL FOREST IMPORTANT SUBSISTENCE USE AREAS

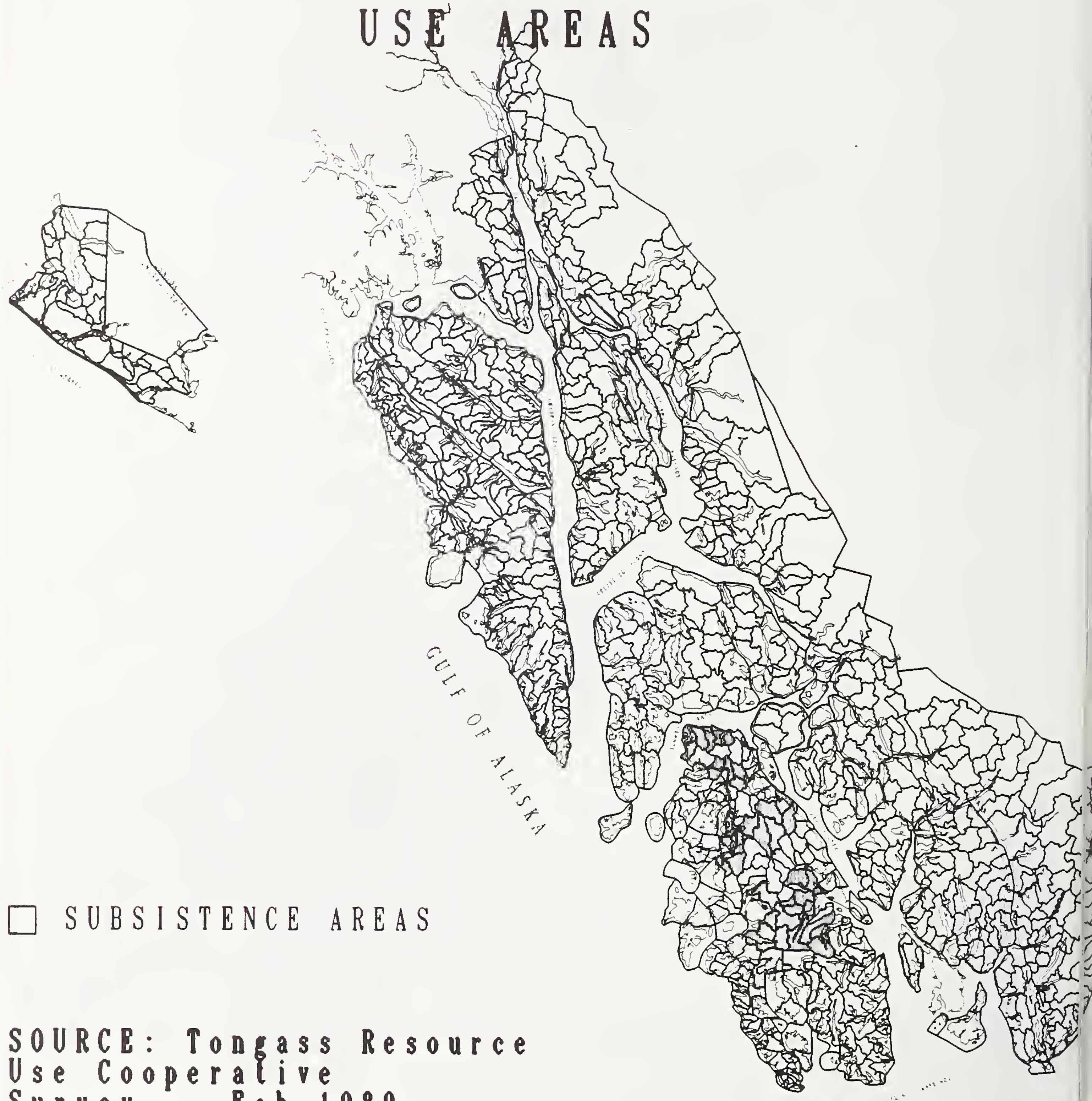
] SUBSISTENCE AREAS

OURCE: Tongass Resource
se Cooperative
urvey. - Feb.1989

COFFMAN COVE

April 19, 1990

TONGASS NATIONAL FOREST
IMPORTANT SUBSISTENCE
USE AREAS



☐ SUBSISTENCE AREAS

SOURCE: Tongass Resource Use Cooperative Survey. - Feb.1989

HOLLIS

April 19, 1990

TONGASS NATIONAL FOREST IMPORTANT SUBSISTENCE USE AREAS

] SUBSISTENCE AREAS

OURCE: Tongass Resource
se Cooperative
urvey. - Feb.1989

KLAWOCK

April 19, 1990

TONGASS NATIONAL FOREST IMPORTANT SUBSISTENCE USE AREAS

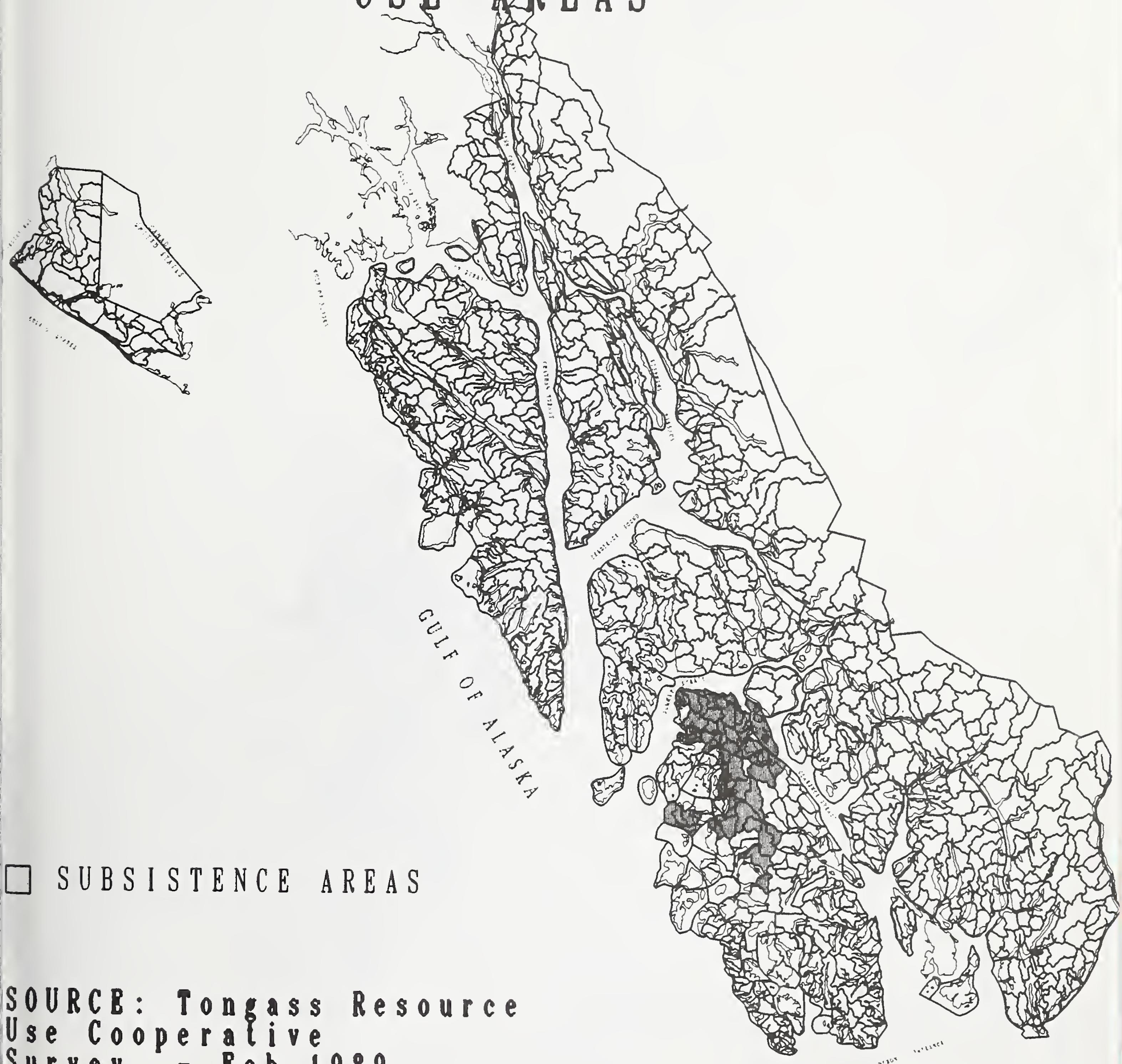
☐ SUBSISTENCE AREAS

SOURCE: Tongass Resource Use Cooperative Survey. - Feb.1989

MEYERS CHUCK

April 20, 1990

TONGASS NATIONAL FOREST IMPORTANT SUBSISTENCE USE AREAS



☐ SUBSISTENCE AREAS

SOURCE: Tongass Resource Use Cooperative Survey. - Feb.1989

N. WHALE PASS

April 20, 1990

TONGASS NATIONAL FOREST
IMPORTANT SUBSISTENCE
USE AREAS

☐ SUBSISTENCE AREAS

SOURCE: Tongass Resource Use Cooperative Survey. - Feb.1989

PETERSBURG

April 20, 1990

TONGASS NATIONAL FOREST IMPORTANT SUBSISTENCE USE AREAS

☐ SUBSISTENCE AREAS

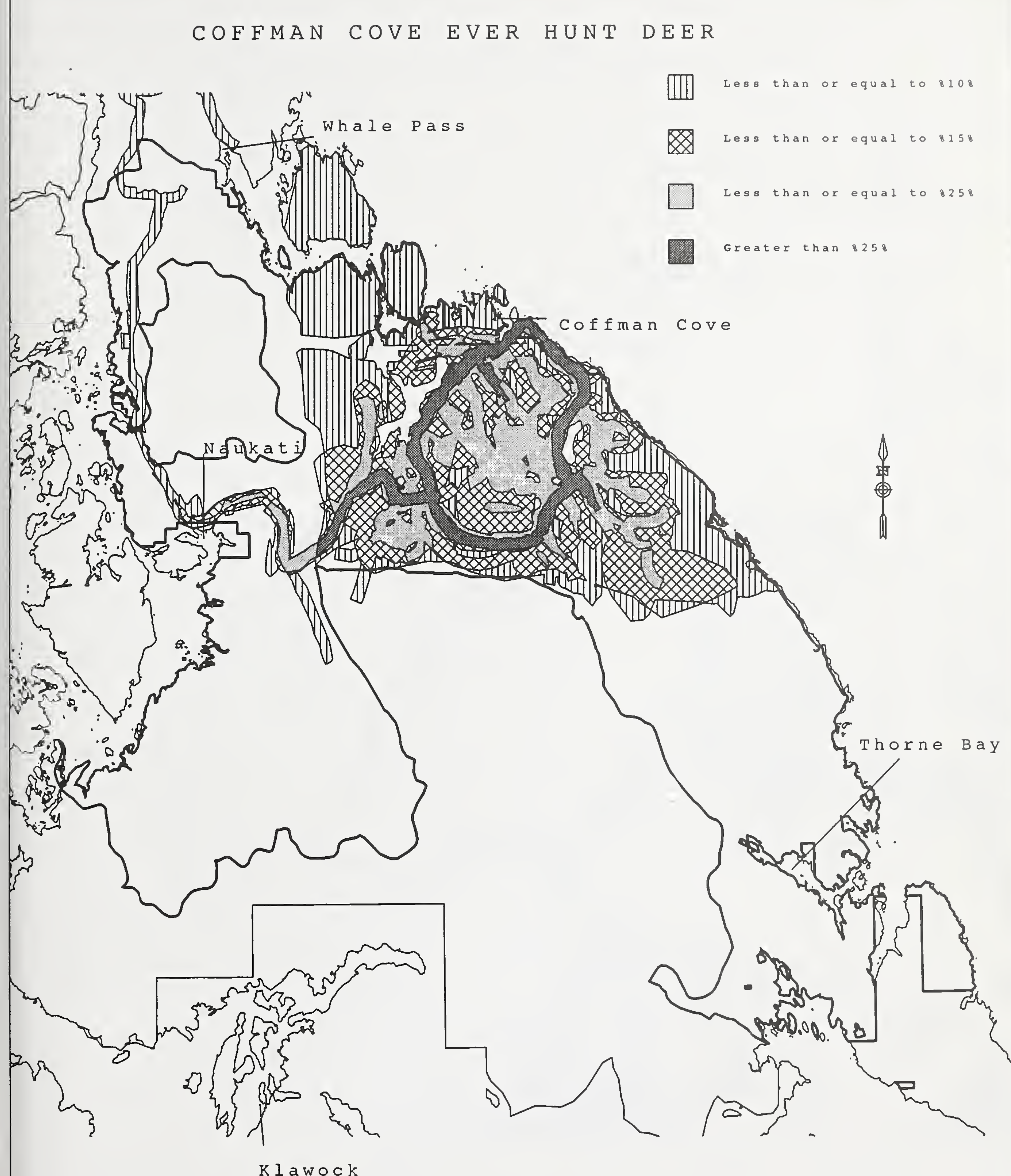
SOURCE: Tongass Resource Use Cooperative Survey. - Feb.1989

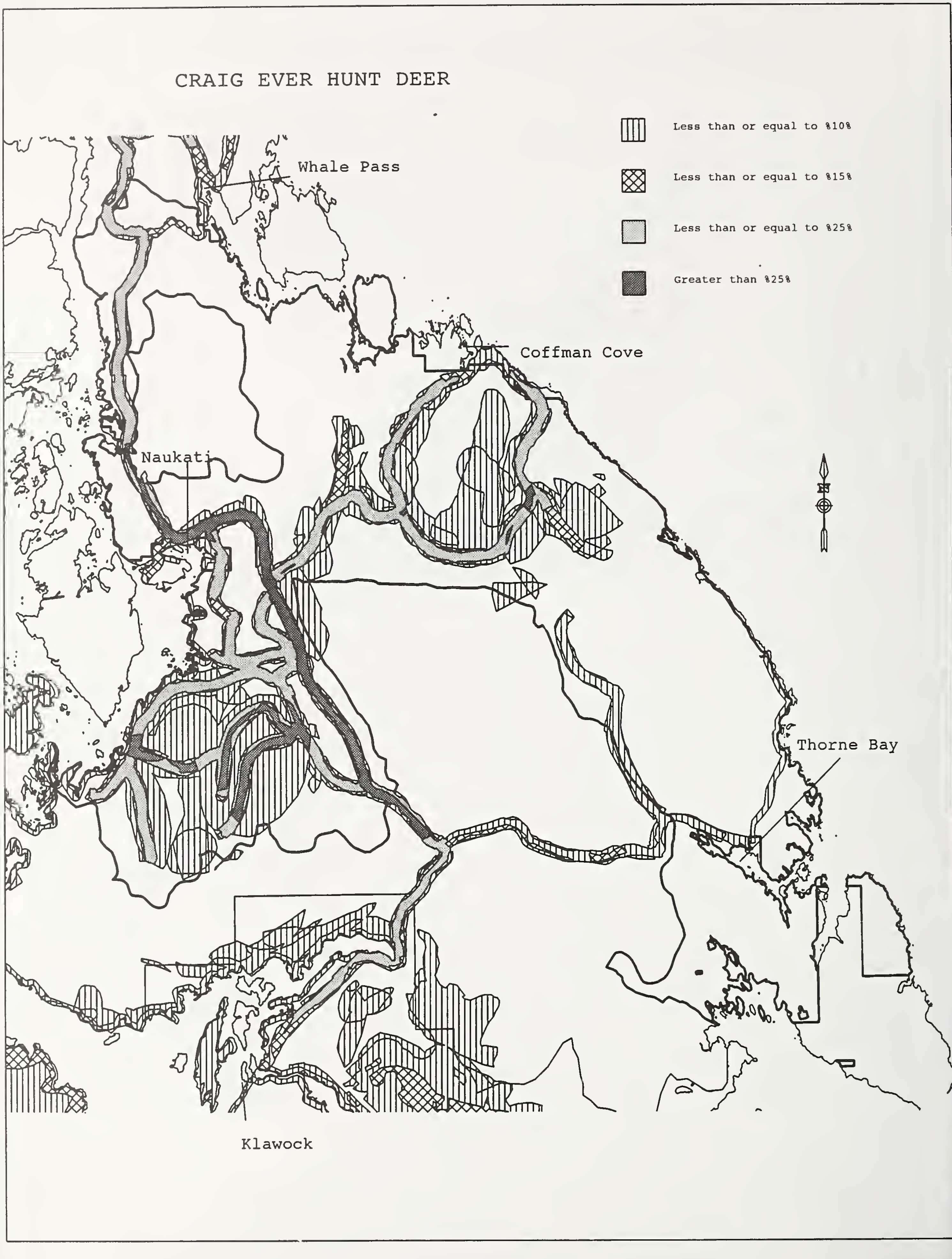
PORT ALEXANDER

April 20, 1990

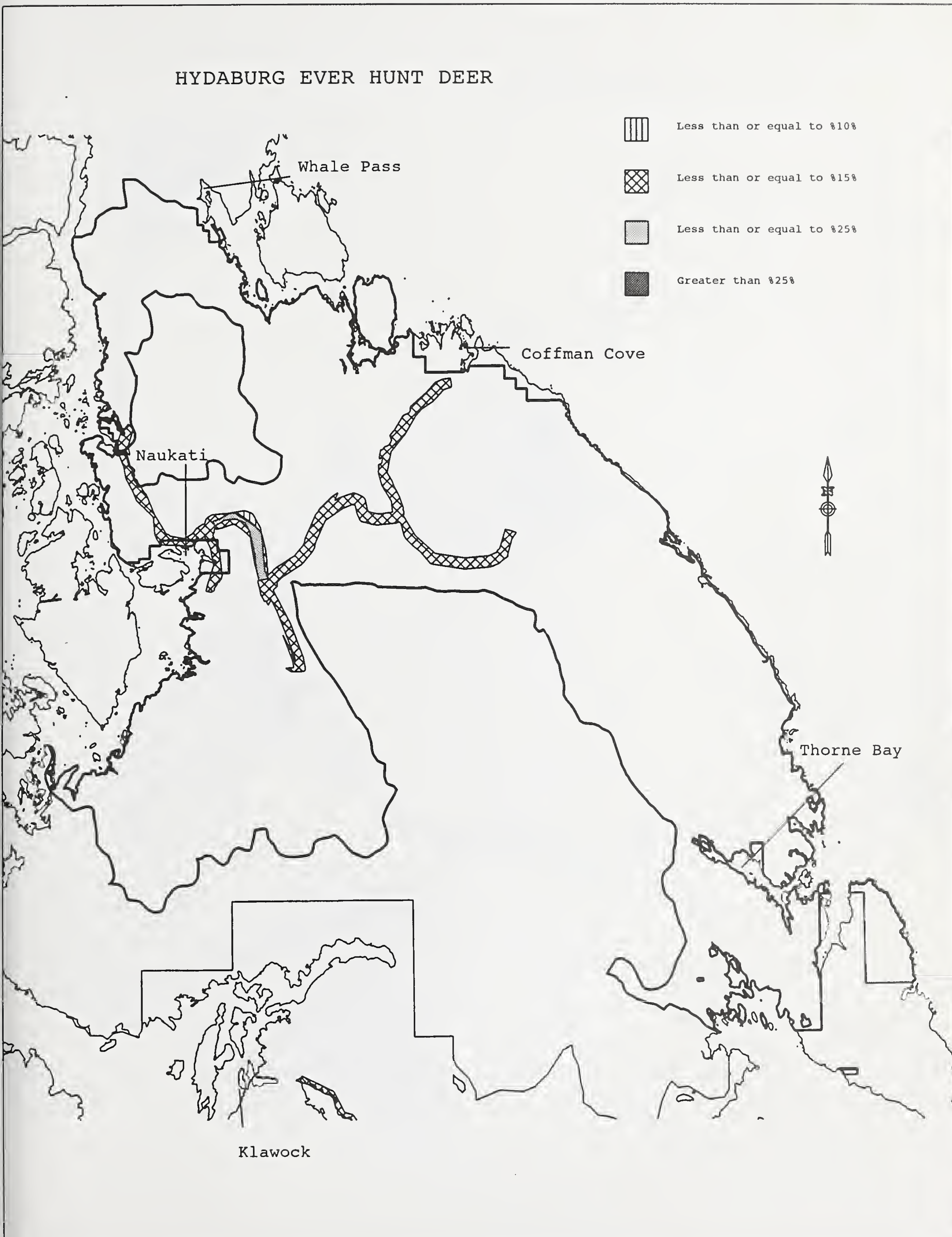
Ever Hunt Deer: by Community

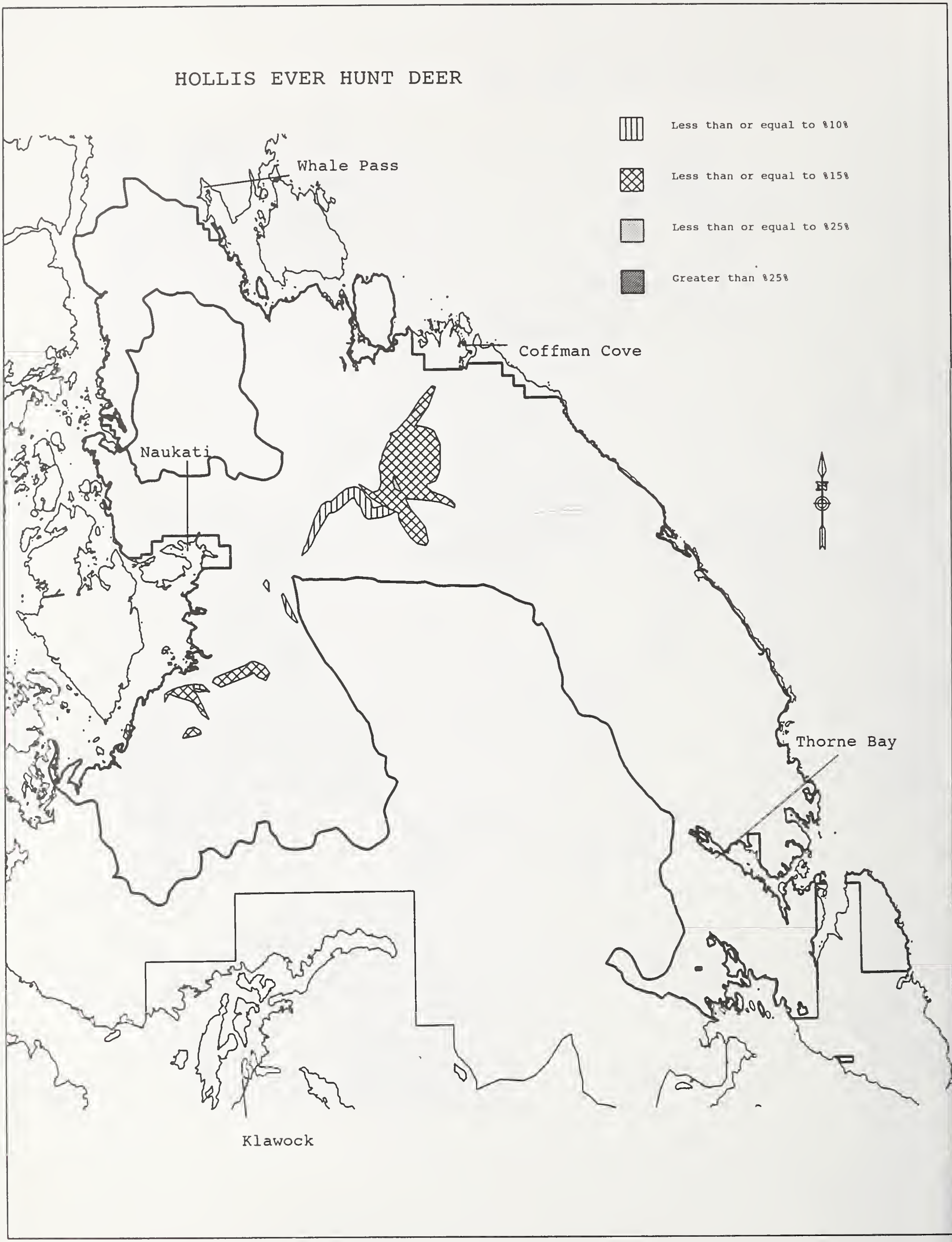
SOURCE: J. Kruse, ISER, 1992


COFFMAN COVE EVER HUNT DEER
Less than or equal to %10%
Less than or equal to %15%
Less than or equal to %25%
Greater than %25%
Whale Pass
Coffman Cove
Naukati
Thorne Bay
Klawock
N

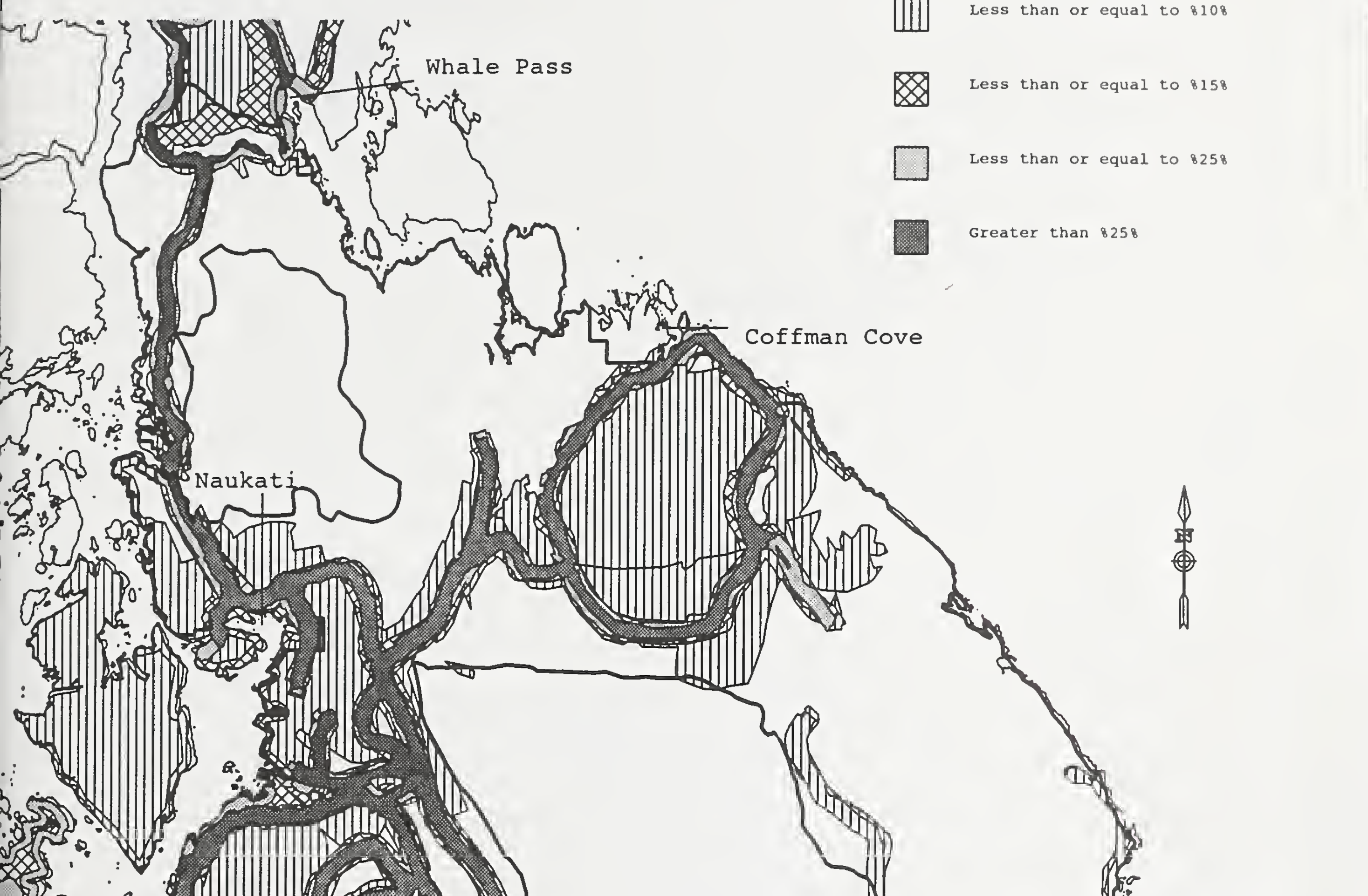


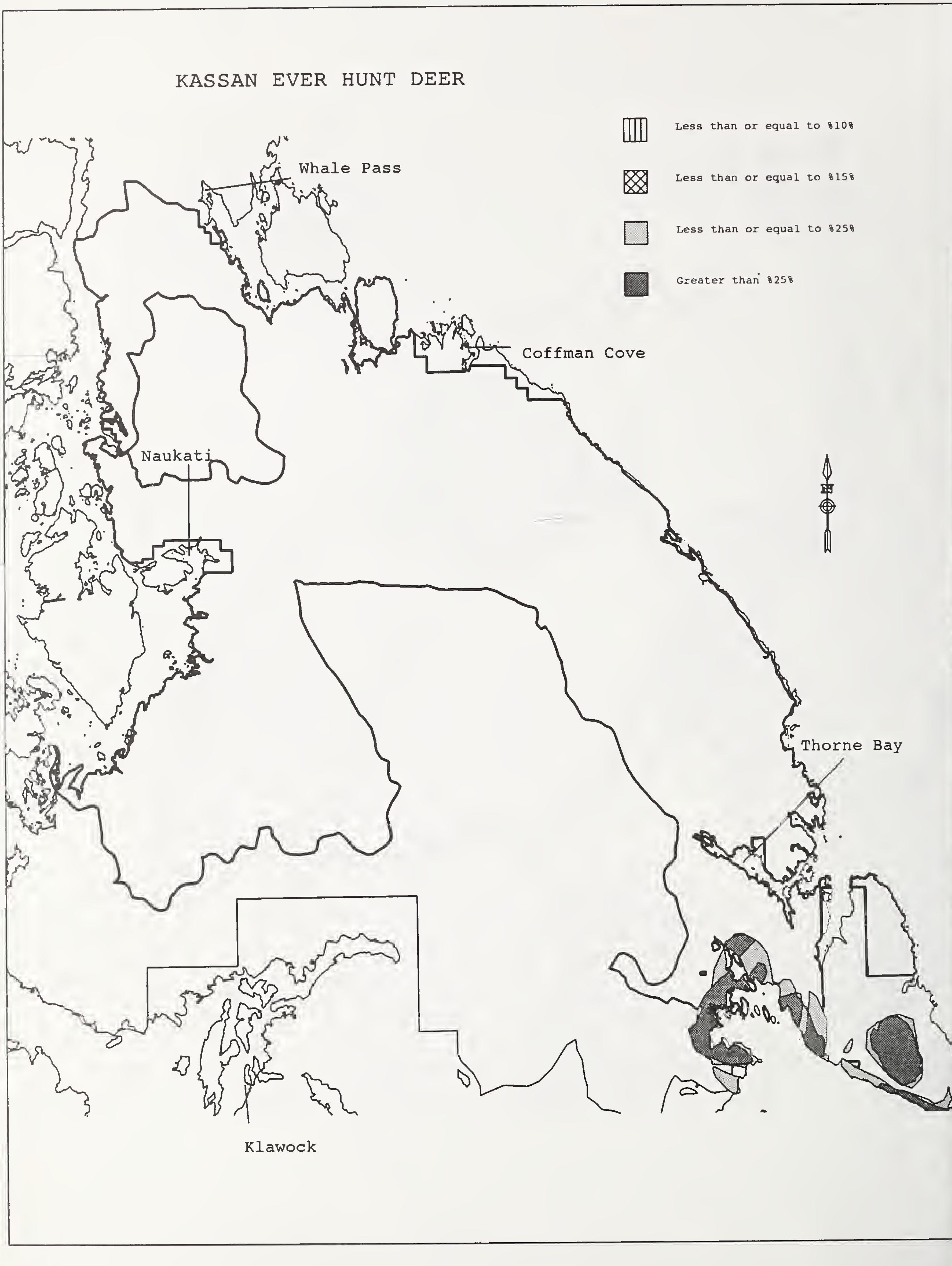
CRAIG EVER HUNT DEER
Less than or equal to %10%
Less than or equal to %15%
Less than or equal to %25%
Greater than %25%
Whale Pass
Coffman Cove
Naukati
Thorne Bay
Klawock
N


HYDABURG EVER HUNT DEER
Less than or equal to %10%
Less than or equal to %15%
Less than or equal to %25%
Greater than %25%
Whale Pass
Coffman Cove
Naukati
Thorne Bay
Klawock

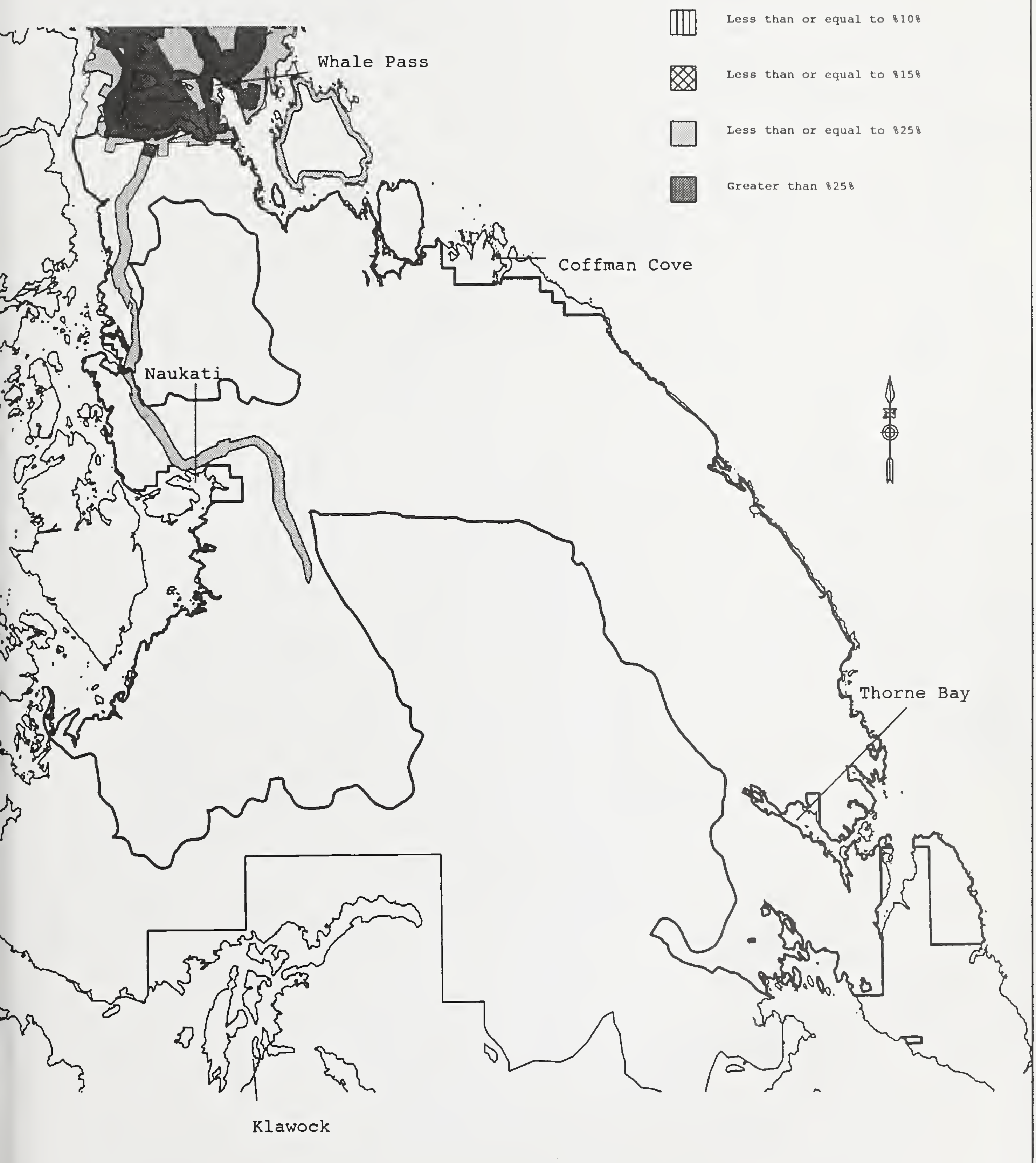

HOLLIS EVER HUNT DEER
Less than or equal to %10%
Less than or equal to %15%
Less than or equal to %25%
Greater than %25%
Whale Pass
Coffman Cove
Naukati
Thorne Bay
Klawock

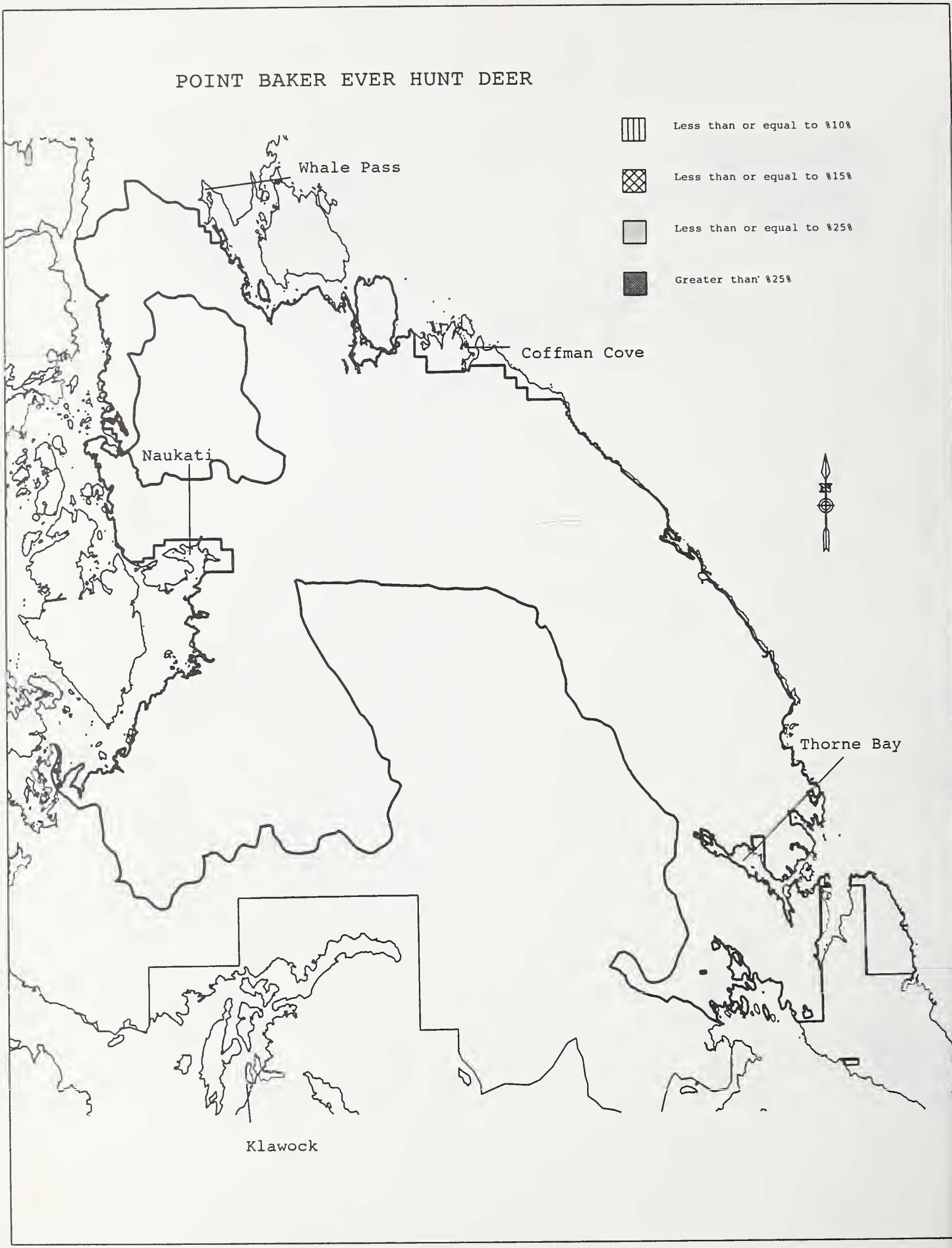
KLAWOCK EVER HUNT DEER



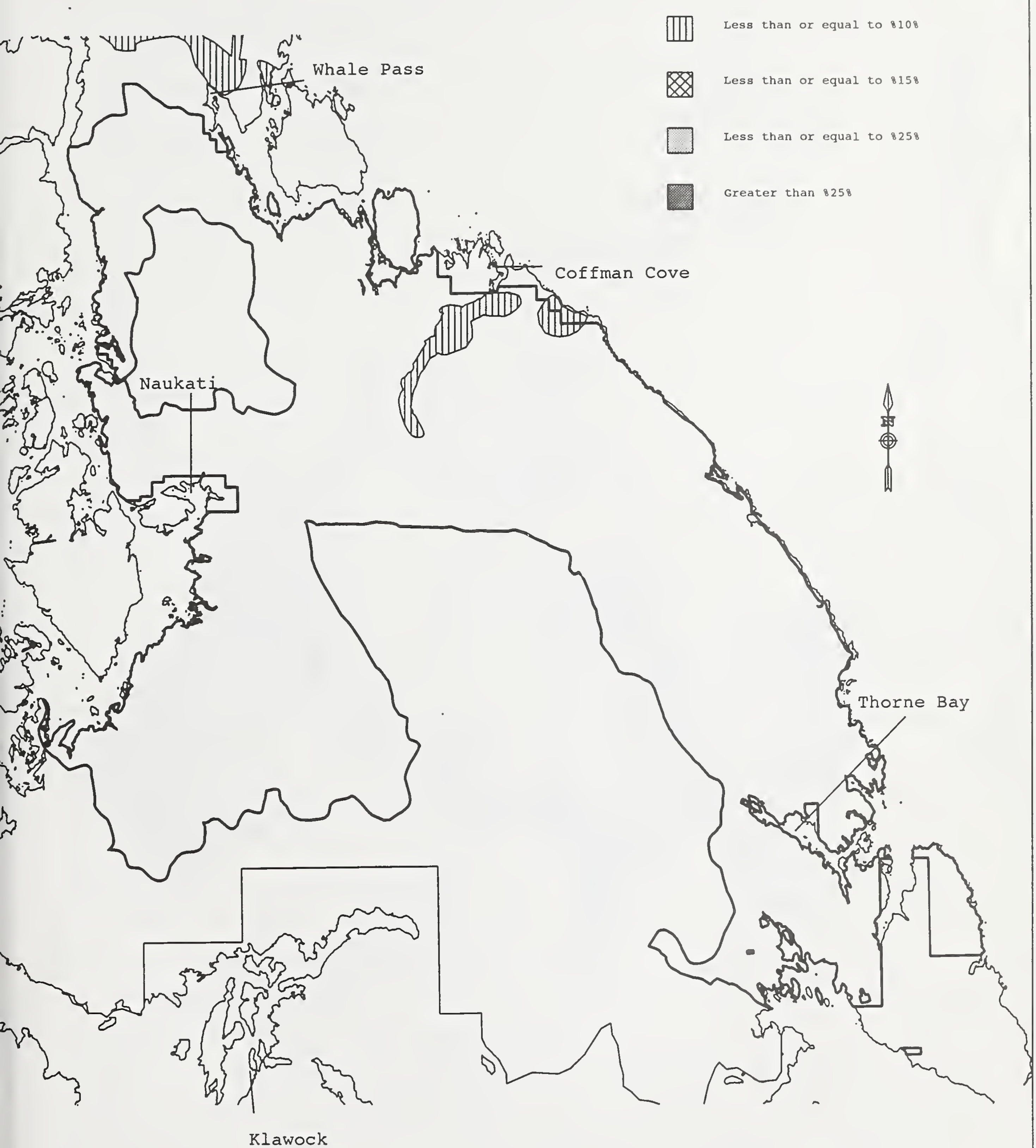

KASSAN EVER HUNT DEER
Less than or equal to %10%
Less than or equal to %15%
Less than or equal to %25%
Greater than %25%
Whale Pass
Coffman Cove
Naukati
Thorne Bay
Klawock

N. WHALE PASS EVER HUNT DEER

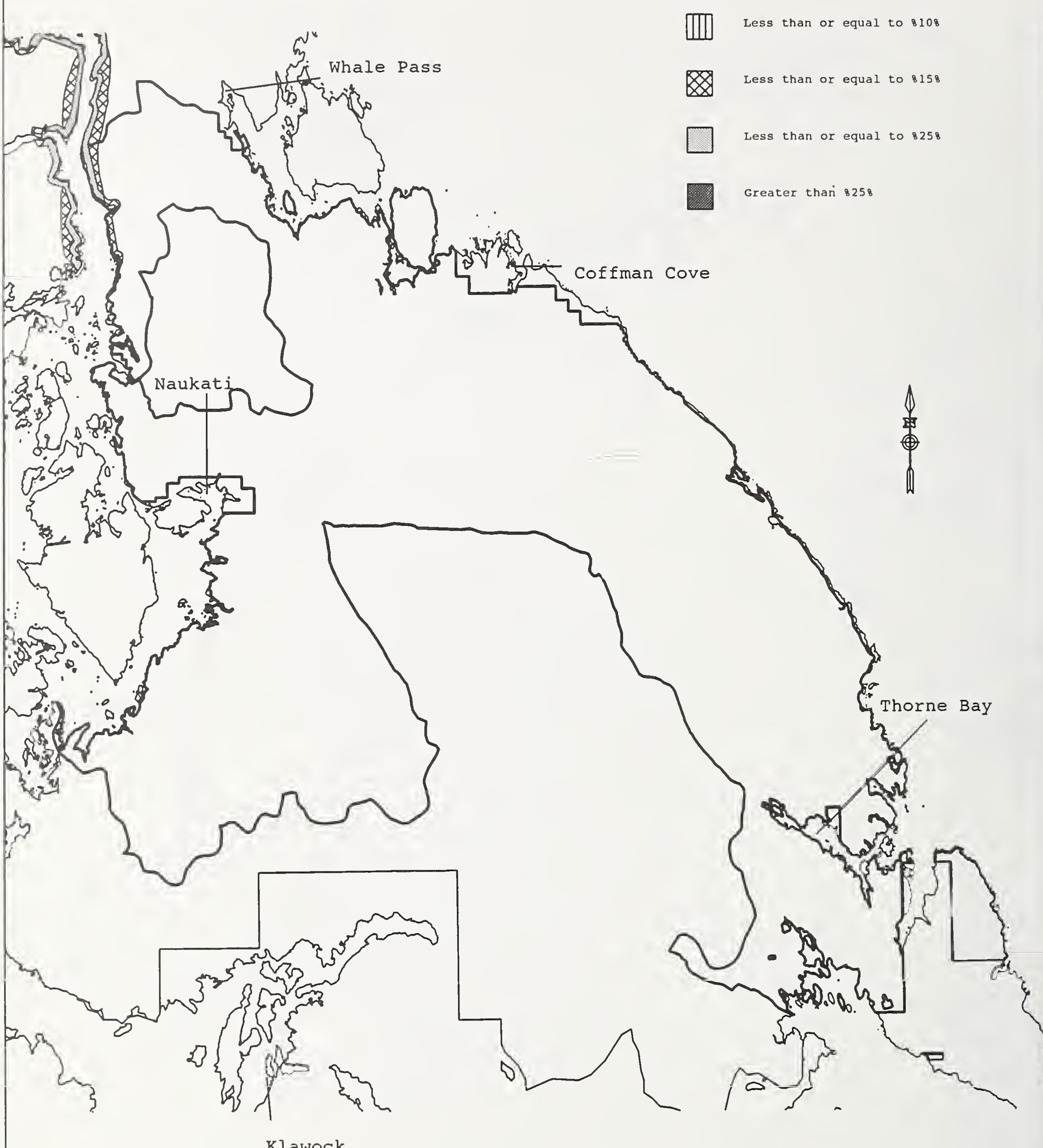



POINT BAKER EVER HUNT DEER
Less than or equal to %10%
Less than or equal to %15%
Less than or equal to %25%
Greater than %25%
Whale Pass
Coffman Cove
Naukati
Thorne Bay
Klawock

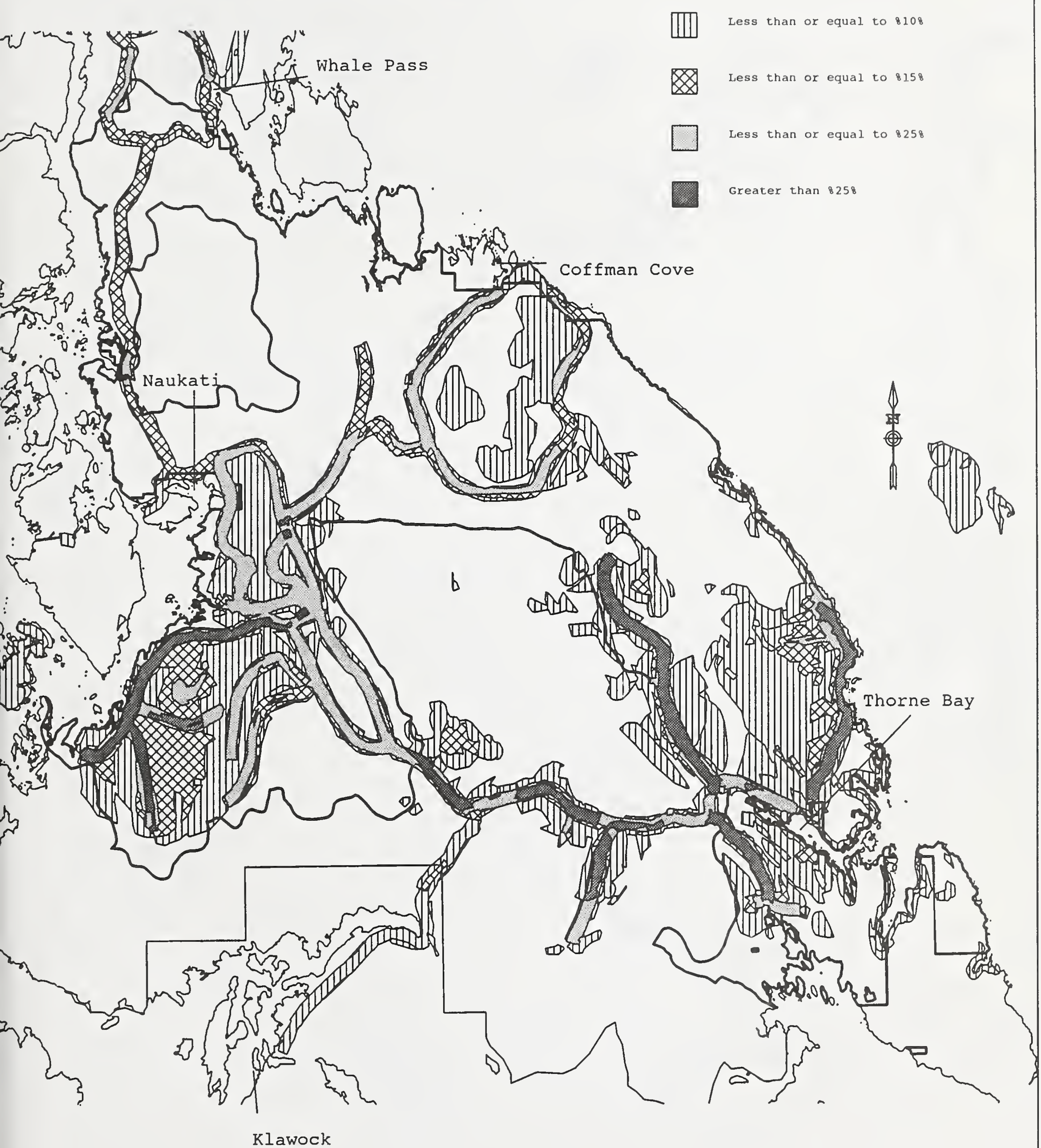
PETERSBURG EVER HUNT DEER



PORT PROTECTION EVER HUNT DEER



THORNE BAY EVER HUNT DEER

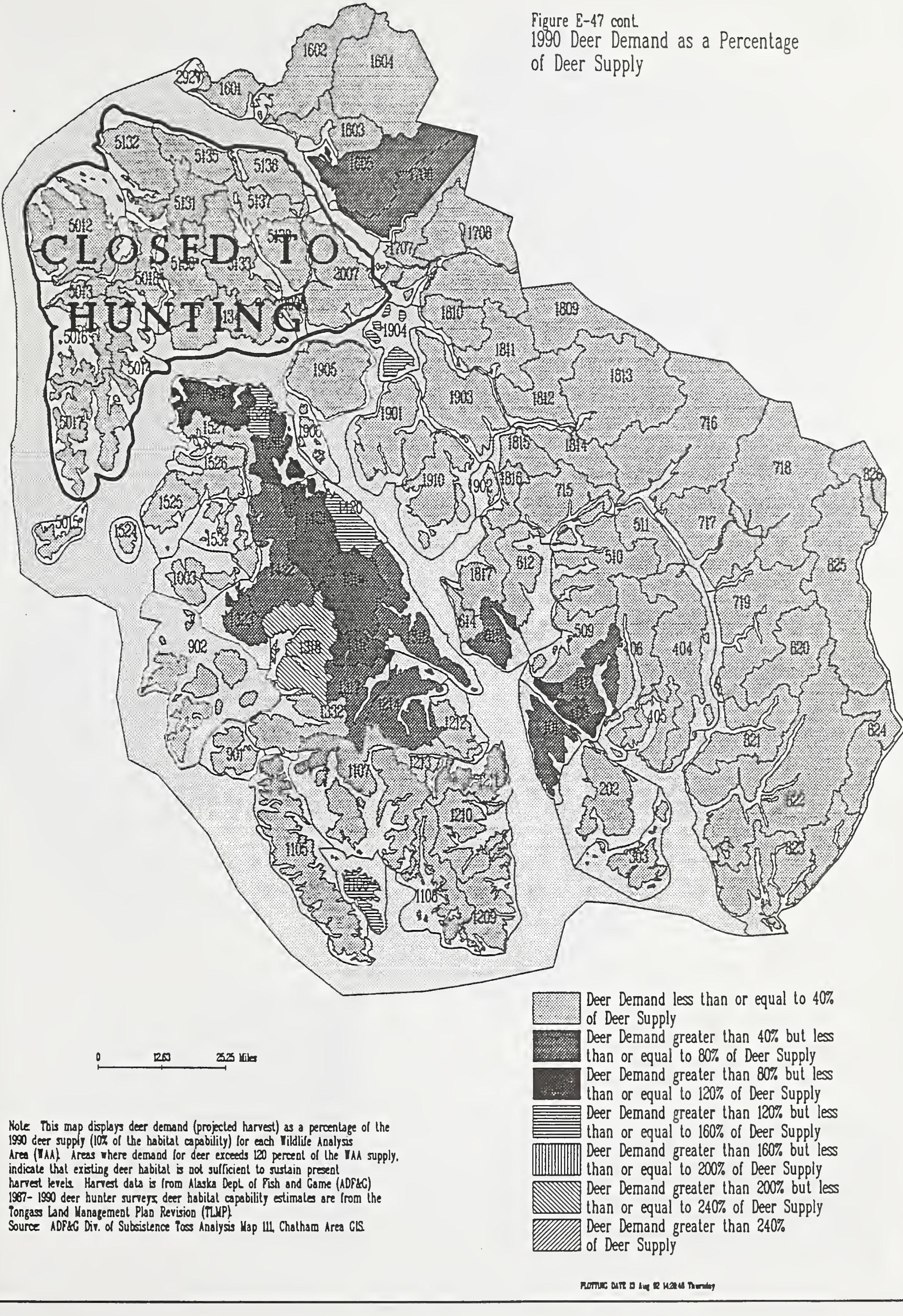


WRANGELL EVER HUNT DEER

Deer Demand as a Percentage of Deer Supply: 1990 and 2040

SOURCE: ADF&G Division of Subsistence, Toss Analysis Maps, Chatham Area GIS

Figure E-47 cont.
1990 Deer Demand as a Percentage of Deer Supply



Note: This map displays deer demand (projected harvest) as a percentage of the 1990 deer supply (10% of the habitat capability) for each Wildlife Analysis Area (WAA). Areas where demand for deer exceeds 120 percent of the WAA supply, indicate that existing deer habitat is not sufficient to sustain present harvest levels. Harvest data is from Alaska Dept. of Fish and Game (ADF&C) 1987- 1990 deer hunter surveys; deer habitat capability estimates are from the Tongass Land Management Plan Revision (TLMP).
Source: ADF&C Div. of Subsistence Toss Analysis Map 111, Chatham Area GIS.

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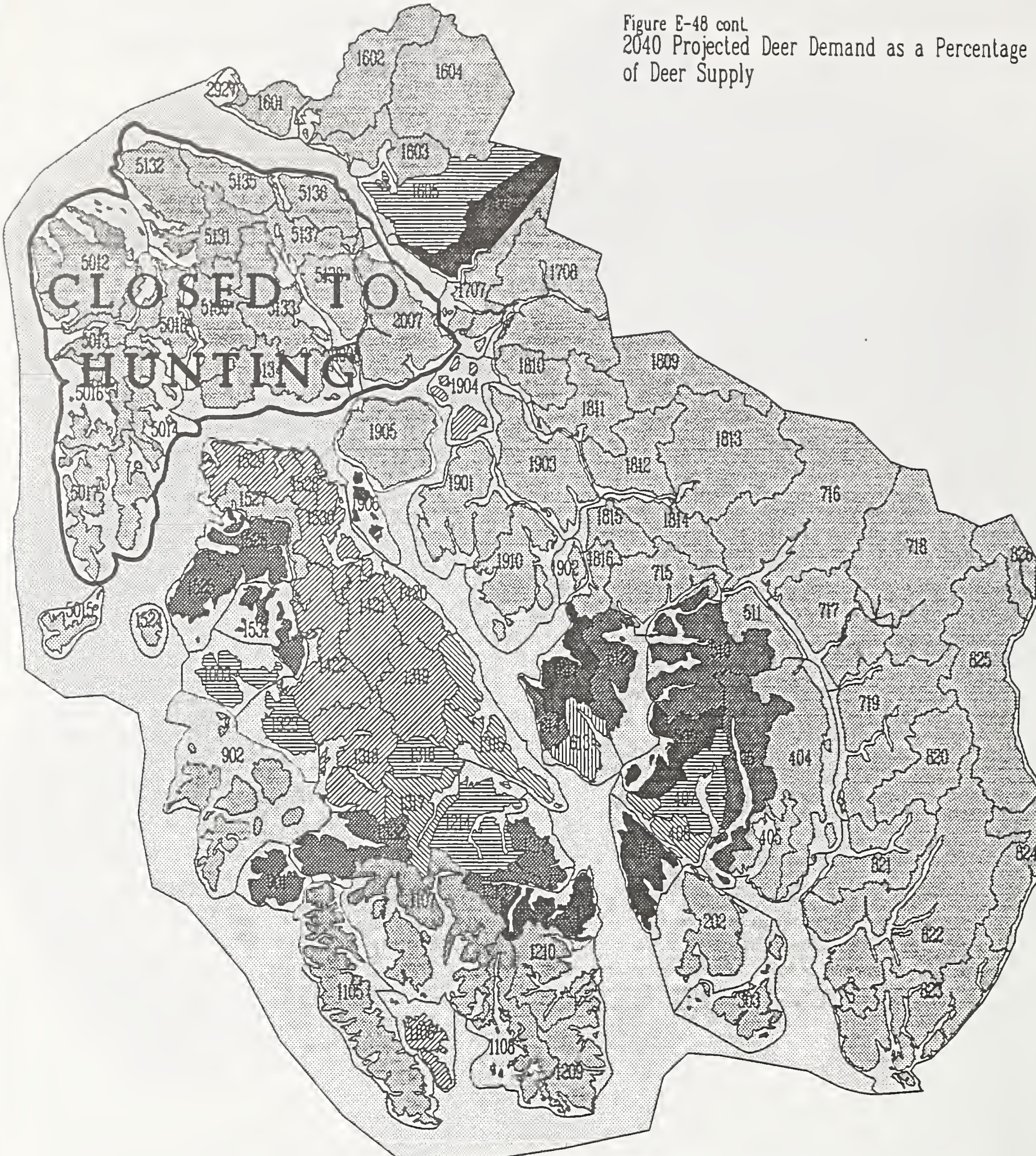
Figure E-48 cont.
2040 Projected Deer Demand as a Percentage of Deer Supply



0 12.63 25.25 Miles

- Deer Demand less than or equal to 40% of Deer Supply
- Deer Demand greater than 40% but less than or equal to 80% of Deer Supply
- Deer Demand greater than 80% but less than or equal to 120% of Deer Supply
- Deer Demand greater than 120% but less than or equal to 160% of Deer Supply
- Deer Demand greater than 160% but less than or equal to 200% of Deer Supply
- Deer Demand greater than 200% but less than or equal to 240% of Deer Supply
- Deer Demand greater than 240% of Deer Supply

Note: This map displays deer demand (1987-90 mean harvest) versus deer supply (10% of habitat capability) 50 years from now for each Wildlife Analysis Area (WAA). Demand is assumed to increase with projected population growth at 18% per decade through 2010 and 15% per decade through 2040. Areas where demand for deer exceeds 120 percent of the WAA supply, indicate that existing deer habitat is not sufficient to sustain present harvest levels. Harvest data is from Alaska Dept. of Fish and Game (ADF&G) 1987- 1990 deer hunter surveys; deer habitat capability estimates are from the Tongass Land Management Plan Revision (TLMP).
Source: ADF&G Div. of Subsistence Toss Analysis Map 112, Chatham Area GIS.

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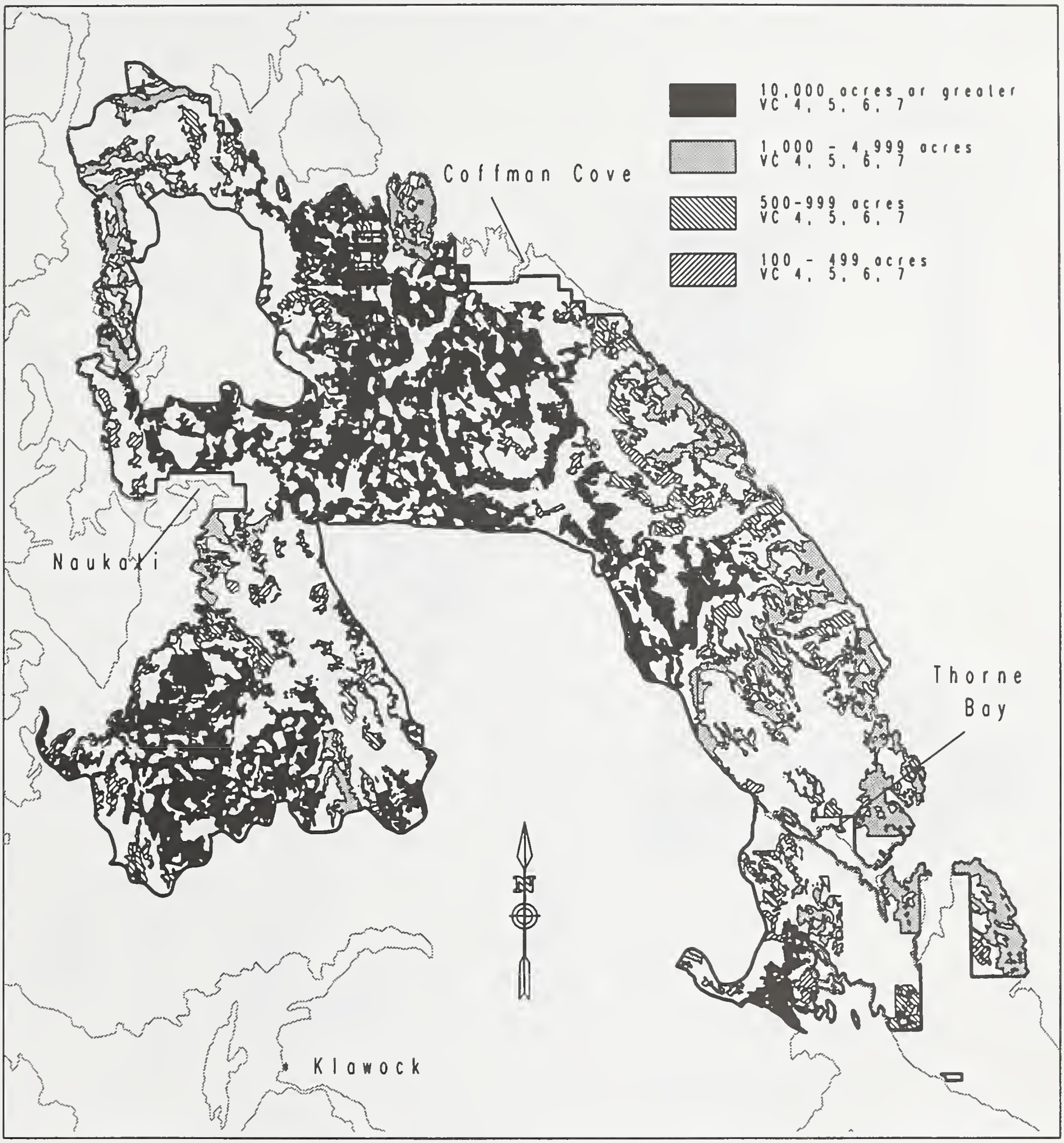
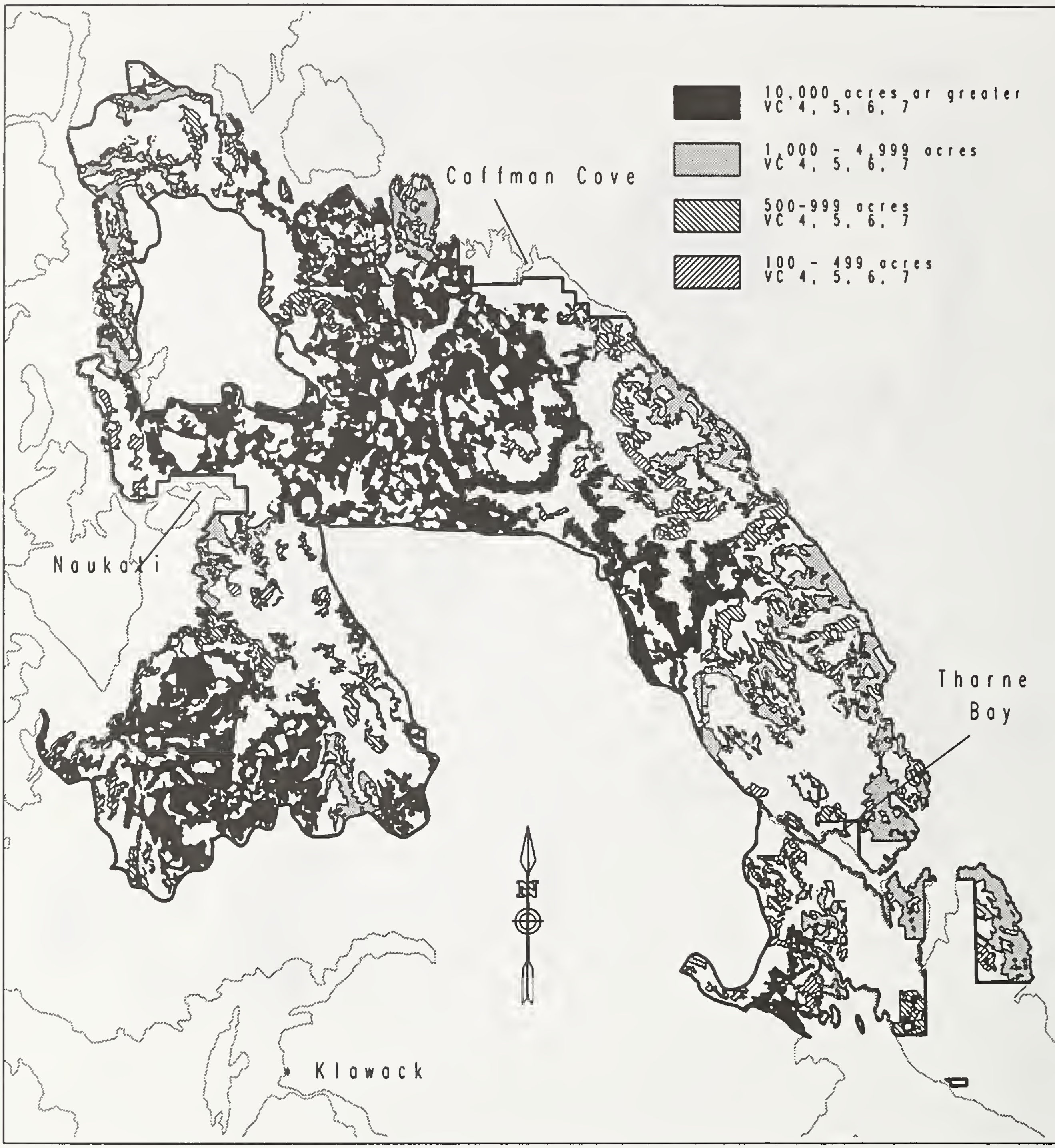
Patch Size Effectiveness
CPOW Alternatives F2, F3, F4, F6

SOURCE: Ketchikan Area GIS

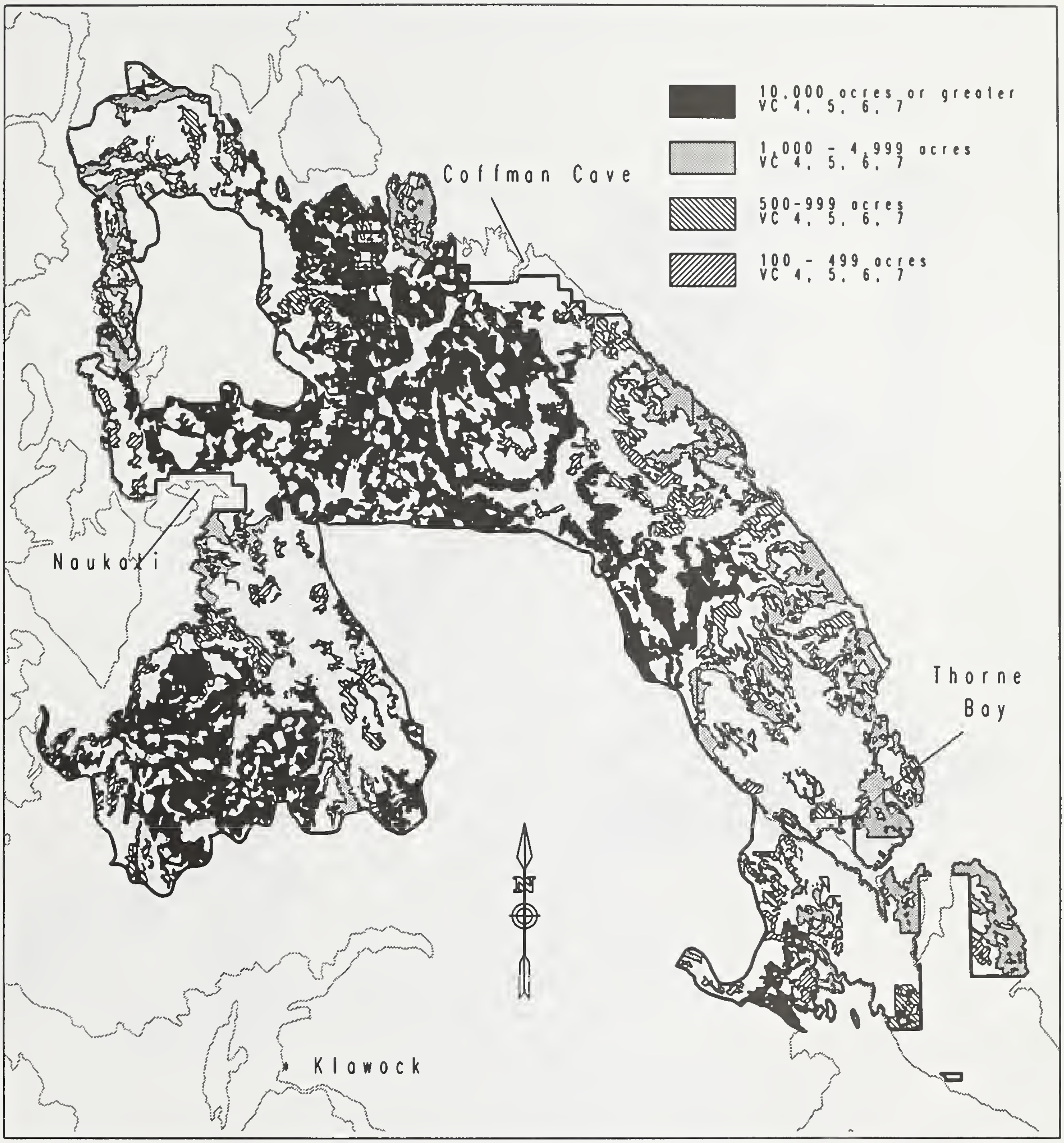
Patch Size Effectiveness, Alternative F2



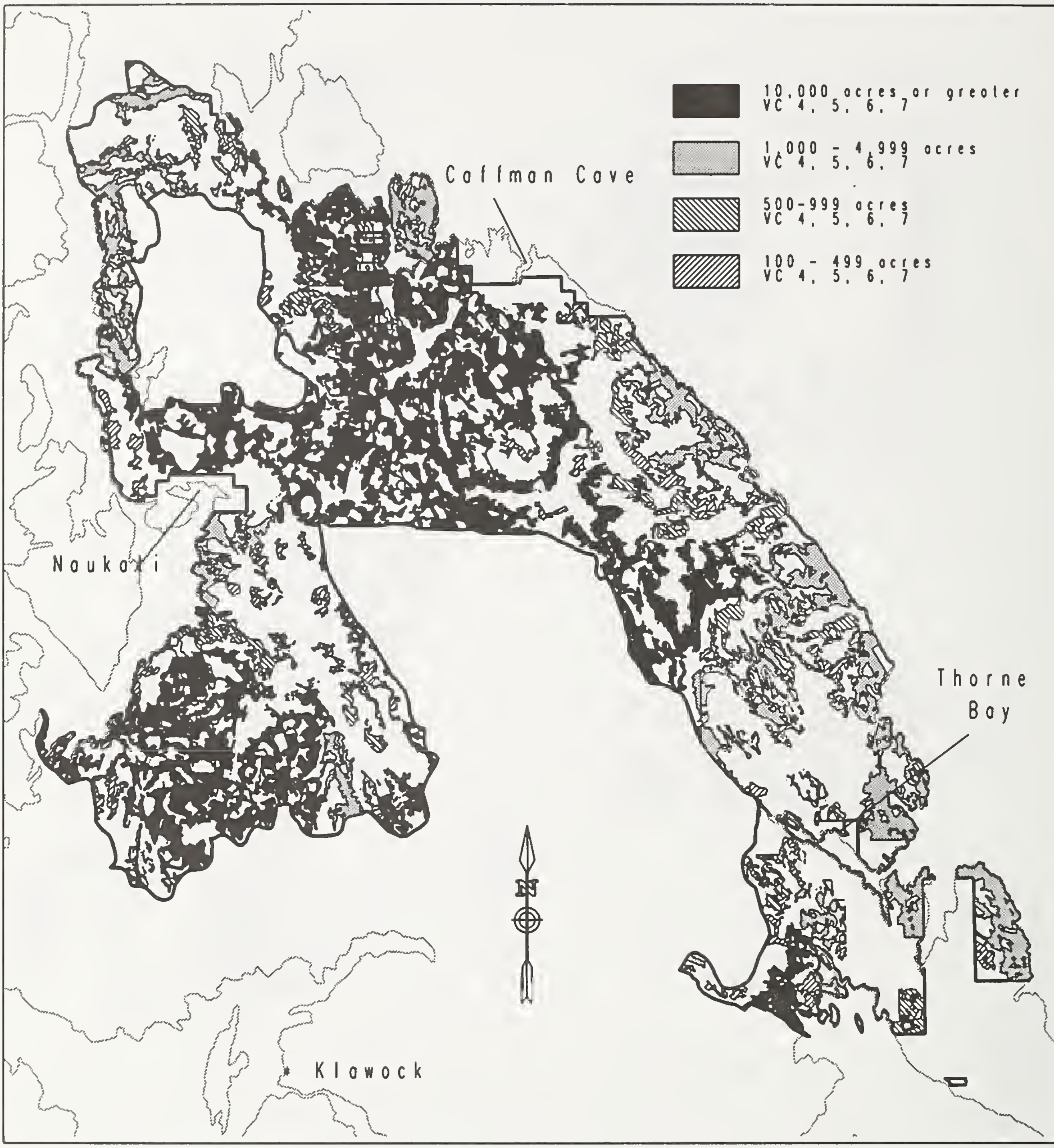
Patch Size Effectiveness, Alternative F3



Patch Size Effectiveness, Alternative F4



Patch Size Effectiveness, Alternative F6



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ACRONYMS AND SYMBOLS

ADF&G	Alaska Department of Fish and Game
AHMU	Aquatic Habitat Management Unit
ANCSA	Alaska Native Claims Settlement Act
ANILCA	Alaska National Interest Lands Conservation Act
ASQ	Allowable Sale Quantity
BBF	One billion board feet
BLM	Bureau of Land Management
BMP	Best Management Practice
CFL	Commercial Forest Land
CFR	Code of Federal Regulations
CPOW	Central Prince of Wales
CZMA	Coastal Zone Management Act of 1976
DBH	Diameter at Breast Height
DEIS	Draft Environmental Impact Statement
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
EVC	Existing/Expected Visual Condition
FEIS	Final Environmental Impact Statement
FOIA	Freedome of Information Act
FSH	Forest Service Handbook
FSM	Forest Service Manual
GIS	Geographic Information System
GMU	Game Management Unit
HCA	Habitat Conservation Area
IDT	Interdisciplinary Team
KPC	Ketchikan Pulp Company
KV	Knutsen-Vandenberg Act
LTF	Log Transfer Facility
LUD	Land Use Designation
LWD	Large Woody Debris (same as LOD)
MA	Management Area
MBF	One thousand board feet
MELP	Multi-Entry Layout Process
MIS	Management Indicator Species
MMBF	One million board feet
NEPA	National Environmental Policy Act
NFMA	National Forest Management Act
NMFS	National Marine Fisheries Service
NOI	Notice of Intent
ROD	Record of decision
ROS	Recreation Opportunity Spectrum
SHPO	State Historic Preservation Officer
TLMP	Tongass Land Management Plan
TRUCS	Tongass Resource Use Cooperative Survey
TSPIRS	Timber Sale Program Information Reporting System
TTRA	Tongass Timber Reform Act
USDA	United States Department of Agriculture
USDI	United States Department of the Interior
USFWS	United States Fish and Wildlife Service
VCU	Value Comparison Unit
VQO	Visual Quality Objective
WAA	Wildlife Analysis Area
>	Greater than
<	Less than